RATIONAL DICTIONARY

of

FRENCH ARCHITECTURE

From XI to XVI Centuries

By

EUGENE EMMANUEL VIOLLET-LE-DUC

Government Architect

Inspector General of Diocesan Notices

Volume VI

From Cable to Cavetto

Translated by M. Clifford Bidder, D. Arch

Emeritus Professor of Architecture

UNIVERSITY OF ILLINOIS

Urbana - Ill.

1919

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FRENCH ARCHITECTURE

From XI to XVI Centuries

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From Gable to Ouvrier

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PARTS. Table. Pediment.

A carpentry term applied to masonry. There is still an association of carpenters to which is given the name of "Gavanda", and in Berry a man with legs bowed outward is called a "gavand". The table was originally the continuation at their apex of two inclined timbers. The table of a former comprises two rafters fastened to the and ofridge, their feet resting on the ends of two plates. (1).

We have seen elsewhere (Arts. Cathedrals; Construction), that at the end of the 11 th century and beginning of the 12 th, there were rebuilt in the cities of the royal domain and of the north of France, all the cathedrals and a great number of parish churches. Although on beginning these edifices rearcoes were abundant, when they reached the level of the high vaults, money came to be lacking, or at least it could only be collected much more slowly. Then it was necessary to employ temporary means for covering, that permitted the sheltering of the constructions completed, as much to avoid injuries caused by rain and snow as to devote these edifices to worship. Pendes in very large monuments, for example like the cathedral of Amiens, it would have been imprudent to erect the piers, the great windows, the wall and nave wall surmounting them, to set the upper carpentry on these isolated walls, or rather on this scaffolding, without turning the great vaults and the flying buttresses that abut them; for the stability of this kind of edifice only consists of a system of equilibrium of opposed pressures, whose mechanism has been sufficiently explained in Art. Construction. Thus it was necessary to build the high vaults in parts, to await the gathering of the rearcoes required to erect the nave walls of the great carpentry. Then was temporarily covered each portion of the completed v vault by the simplest and cheapest method; over the side arcoes were erected wooden tables with spexes on a level and a ridge placed on posts on the axis of the main roof. These tables were connected with that ridge, the rafters were set, battens and tiles were placed over the whole. (2; see sketch A).

The constructors took care to reserve at the impostes of the vaults basins and gargoyles casting the water directly on the ground, as at the S. Chapelle of Paris, or into channels of the flying buttresses as at Notre Dame of Amiens. (Sketch

GABLE. Gable. Pediment.

A carpentry term applied to masonry. There is still an association of carpenters to which is given the name of "Gavauds," and in Berry a man with legs bowed outward is called a "gavaud." The gable was originally the continuation at their apex of t two inclined timbers. The gable of a former comprises two rafters fastened to the end of a ridge, their feet resting on the ends of two plates. (1).

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B at C). Thus they could wait several months, even some years, before building tympanums over the windows, eave walls and the great carpentry, the vaults were covered, and the masonry had nothing to fear from the rain, snow or frost. As soon as the accumulated collections permitted continuing the work, between these gables and without destroying the temporary coverings were built the piers D and portions of the eave wall G; on t these parts of the eave wall, whose tops reached the ridges of the temporary covering, were placed the plates of the final roof (Sketch A at H), the great carpentry was placed and covered, and this being completed, the temporary covering underneath was removed with the wooden gables, and the tympanums were set on the side arches or archivolts of the windows, as well as on the ends of the cornices and eave wall still lacking. Pipes arranged in the piers D (See sketch B) led the water from the gutter E to the gargoyles G, which were thus utilized with the temporary and final covering. But the eye had been accustomed to see these wooden gables over the side arches of the vaults, interrupting the horizontal lines of the c cornices and eave wall. When they were removed, the crown of the completed edifice must appear cold and poor; the architects then had the idea of substituting stone gables for these temporary constructions, whose effect was pleasing. That is what Pierre of Montereau did at the S. Chapelle of Paris after 1245.[1] That example was frequently followed about the end of the 13 th century, notably around the choir of the cathedral of Amiens; then later at Cologne.

Note 1.p.4. Art. Fenetre, Fig. 19.

During the second half of the 13 th century, stone gables thus became a decorative motive frequently employed. The north and south portals of the transepts of the cathedral of P Paris, whose construction dates from 1257, are surmounted by gables, that do not fulfil any useful functions, but which terminate the archivolts by great partly perforated triangles, breaking the monotony of the horizontal lines of these immense gables.

Here (3) is the gable of the southern portal of Notre Dame of Paris. The balustrade of the gallery passes behind that g gable, which is nothing but an isolated wall 13 ins. thick. Other smaller gables surmount the niches accompanying this p

portal, and this form of great serrations at the base of the edifice. We have stated elsewhere [2] how the constructors of the middle ages employed these ornamental gables to load the side arches and prevent them from warping.

Note 2.p.5. Art. Construction, Fig. 108.

The three portals of the cathedral of Amiens are very deep, comprised between great projecting buttresses, and are covered by gable roofs closed by solid gables, giving almost a right angle at top, only ornamented by rampant crockets and a crowning cross-flower. At the cathedral of Laon was adopted the s same arrangement; but the architect of the cathedral of Rheims about 1260, while retaining the principle, desired to give un unequaled richness to the gables of the three portals.

The gable of the middle porta, (4) represents the coronation of the Virgin at colossal size, surmounted by a series of canopies ascending like steps to the apex of the triangle. The statuary is in the round; the projections are prounounced to the point of almost causing the primitive form of the gable to be forgotten. Here the lines of the architecture are destroyed by the sculpture.

While the 14 th century gave to the gables great richness of details, yet it always had as a principle to leave to the lines of the architecture their necessary importance. The gable of the portal of the Calende at the cathedral of Rouen is one of the best composed among those remaining to us from that epoch. (5). It is entirely opened above the gallery, and decorated by reliefs in the foils below; its copings are dacorated by delicate tracery, that replaced the crockets, as on t the south portal of the cathedral of Paris.

In the 15 th century the coopings of the gables became still steeper, thicker, more loaded by mouldings, and the internal tracery is more open and lean. At the end of the 15 th century the copings of gables often form concave curves above the archivolts like elongated recurved arches. (Arts. Contre-Courbe; Construction, Figs. 106, 108; Fenetre, Figs. 19,26; Fleche, Figs. 4, 6; Lucarne; Pignon).

GALERIE. Gallery.

A level covered passage opening to the interior or exterior, serving for communication from one place to another, for pass-

passage at the different stories of the edifice; it is rather the monumental appearance that the greater or lesser height, that gives the name gallery to that passage. The term gallery carries with it the idea of a walk, narrow in comparison to its length, but decorated with a certain richness. The name of gallery is also given to every service passade (corridor), also quite narrow, but very prominent and forming a part of t the architecture of an edifice. One speaks of the gallery of the kings at Notre Dame, the gallery of the side of the cathedral of Rouen, although this last gallery is only a very bad corridor. As for the galleries surmounting the side aisles of churches, archaeologists have agreed to give them the name of triforium, which we retain without discussing the value of t the term.

We shall then divide galleries into service galleries contributing to the external or internal decoration of monuments, and galleries for walking (corridors) in castles or public or private edifices.

The architects of the middle ages established in their great monuments service corridors at different heights in order to make the oversight and maintenance easy. The high facades of cathedrals, for example, were divided into several stories by galleries, that allowed communication from the interior to t the exterior, maintain the surfaces, repair the glass of the rose window, and at need to decorate the facade by hangings d during great ceremonies. Our French cathedrals in the north, built about the beginning of the 13 th century, whose facades have been completed, are decorated by superposed galleries. The facade at Notre Dame of Paris, which was erected between the years 1210 and 1225, presents over the portals a first g gallery, very rich, whose intercolumniations are filled by colossal statues of the kings of Judah. That gallery is an actual portico covered by a ceiling of thick slabs. Above is the gallery of the Virgin under the rose window; that is not covered and is merely a terrace with a balustrade. A third gallery in the form of a very slender and very rich portico encloses the bases of the two towers and connects them. On the facade of the cathedral of Amiens over the three portals is a c covered service gallery, richly ornamented by arcades and little columns; the gallery of kings surmounts it, and this supp-

Note 1.p.10. See T th Pottetten sur l'architecture, the author thereof of this fooode.

The style of the gallery of the Hôtel de Ville Jean de Thorin is quite different. It resembles Italian palaces with arcades and a terrace on the first floor, it resembles as the door of the Pavillon Lorette and over the central door rises a bas relief of the Virgin and Child. The idea of the gallery is certain inspiration of its year, before the Gothic assembled in the place, the clerks of Notre Dame imagine the Gloria in Excelsis. A local nation of colonnal statues of kings surrounds the base of the main gallery where above that entrance. It Notre Dame of Courtrai is also a similar arrangement, but in much simpler proportions, minding only because the towers. The rue Rivoli is lack of what these galleries are in the spirits of the middle age. To small easier into more complete details relating to these important parts of construction.

SALMONTHA DRA ROTA. Galleries of Kings.

The Gothic gallery of Elgin is also one of the very rare models as far and the serving as a passage for the service of processions, as that of the facade of Notre Dame of Paris; this manner is assigned to it later than 1220. Two towers of a series of oiges (1) accompanied a single gallery on corbelling, and before each of them is placed a column. The 9 kings are placed as a set presented by an arcade supported by columns. The. 9 first role gallery in sculpture, the statues of the first are placed as a, a little behind the corbels of the column, and so on is a series change behind the arcade. Several pieces placed behind the columns. The Barrow called that of the Virgin is at C, big. 7 presents the original architect of the gallery. In the style of Lancelleans, that the portrait the most beautiful of all been placing in the tympan of our Frame Cathedral. The visit also the state, the sad saying in Pierced monumental, utilizing in Italia, form a dancing multiple proof the essence of the kings. It has its effect in the gallery of the Frame, in the sculpture. The the gallery of the Kings Face of Pier in Lyons - Face and still more than the Saint particle, and very graciously drawn. The statuary is still on the style of the Gaudeed, stocky frame, without longer lengthening in architectural manner.

Note 1.p.10. See T th Pottetten sur l'architecture, the author thereof of this fooode.

supports a terrace as at Paris. At Rheims at the base of the two western towers and over the central rose window as the uncovered gallery called the Gloria. Frog that gallery at certain festifals of the year, before the people assembled on the place, the clergy of Notre Dame intones the Gloria in excelsis. A long series of colossal statues of kings surrounds the base of the gable andthe towers above that terrace. At Notre Dame of Chartres is seen a similar arrangement, but in much simpler proportions, extending only between the two towers. One can thus obtain an idea of what these galleries are in the edifices of the middle ages. We shall enter into more complete details relating to these important parts of construction.

GALERIES DES ROIS. Galleries of Kings.

The oldest gallery of kings to which can be given that name, because at the same time serving as a passage for the service of decoration, as that of the facade of Notre Dame of Paris; a date cannot be assigned to it later than 1220. That consists of a series of piers (1) supporting a stone ceiling on corbellings, and before each of these is placed a column. The k kings are placed at A and are sheltered by an arcade supported by columns. Fig. 2 gives this gallery in section; the statues of the kings are placed at A, a little behind the bases of the columns, and at B is a service passage behind the strengthening piers placed behind the columns. The terrace called that of the Virgin is at C. Fig. 3 presents the external appearance of the gallery. By its style of composition, that gallery is certainly the most beautiful of all those existing on the facades of our French cathedrals. One will note how this arcade, low and simple in general composition, brilliant in details, forms a pleasing enclosure around the statues of the kings. As for its effect on the entirety of the facade, it is excellent. Yet the gallery of the kings of Notre Dame of Paris traces a rich and solid zone above the three portals, and very happily crowns them. The statuary is well at the scale of the monument, appears grand, without thereby lessening the architectural members. [1]

Note 1.p.10. See 7 th Entretien sur l'architecture, the entirety of this facade.

The style of the gallery of the kings of Notre Dame of Rheims is quite different. At Rheims this gallery replaces that

Note 1.p.18. L'architecture du Ve au XVIIe siècle et les arts qui en dépendent. Vol. I.

In the essential of design, the arrangement of the nave of Paris is very beautiful. Like most of Paris, it succeeds the same purpose; but at Amiens [illegible] the gallery of the kind and the design of the porches is [illegible] gallery of the nave. Essential design of the arc of the [illegible] ture. Figure 17?). The lower gallery (a), base of the triple and the upper further; are all structure and connection with the lower secrets of the towers. Behind the lower gallery [illegible] arcs arches without transept, which figures the central nave without transept gallery. Before the piercing of the gallery of the great orders. Other major minors are open to begin the gallery of the kind; these look on a second gallery over the lower gallery. The view (b) explains here the [illegible] arrangement. Also unfortunately in the connection by the orders front. The notes (b), (c) that the lower gallery is [illegible] or upper overhead of large column arrangement before a [illegible] transept; diagonally [illegible] transept by [illegible] minor [illegible] on the fronts of the [illegible] the [illegible] nave. Behind these diagonally [illegible] the arch in front; it is a single transept supported on a [illegible] which [illegible] only under the [illegible] of the arch by the [illegible] [illegible] from the two minor [illegible] of the circle. This the [illegible] is due to fact the [illegible] of the [illegible] transept the lost [illegible] metalness of the [illegible] [illegible] of which [illegible] the lower gallery [illegible] the [illegible]. The [illegible] of the [illegible] [illegible] [illegible] the [illegible], and [illegible] the [illegible] of the [illegible]. Each of [illegible] [illegible] with a [illegible] and [illegible] from the [illegible] of the [illegible] the [illegible] of [illegible], but [illegible] the [illegible] of the [illegible].

at Paris which surrounds the bases of the towers; it is merely a decoration and does not furnish that continuous passage. The construction dates from the end of the 13 th century, and its statuary is mediocre. This gallery being given in detail in the work of M. Gailhabaud,[1] it does not seem necessary to reproduce it here.

Note 1.p.18. L'Architecture du Ve au XVIIe siecle et les arts qui en dependent. Vol. I.

As for the cathedral of Amiens, the arrangement of its gallery of kings is very beautiful. Like that of Paris, it surmounts the three portals; but at Amiens between the gallery of the kings and the gables of the porches is an intermediate gallery of the most beautiful style of the art of the 13 th century. (About 1235). The lower gallery (4), that of the kings and the upper terrace A are all practicable and communicate with the lower stories of the towers. Behind the lower gallery open great windows without tracery, which lighted the central nave through another internal gallery, before the placing of the gallery of the great organs. Other short windows are opened behind the gallery of the kings; these look on a second g gallery over the lower gallery. The plan (5) explains that beautiful arrangement, which unfortunately is now concealed by the organ front. One notes (Fig. 4) that the lower gallery re rests on piers composed of three columns grouped before a pilaster; discharginm arches richly ornamented by cusps and sculptured animals on the fronts of the imposts rest on these piers. Between these discharging arches the arch is free; it is a simple tracery supported on a monolithic column and maintained only under the intrados of the arch by two projections hanging from the two upper voussoirs of the circle. Thus the architect did not have to fear the rupture of the open tracery under the load orby settlement of the upper parts. A single course of stone separates the lower gallery from that of t the kings. The stone slab ceiling of the uncowered upper gallery rests on the lintels, that form the imposts of the arcade of the kings. Each of these imposts is cut with a channel and sends the water from the slab ceiling to the outside through the heads of gargoyles, that ornament the faces of the abacuses.

GALERIES DE SERVICE DES EGLISES. Service galleries of Churches.

With the gallery of the kings of the cathedral of Amiens, we see one of those both service and ornamental galleries, th that break the vertical lines of the facades. During the 13 th century these galleries are tolerably varied in their design and details; they take a considerable importance like the great open gallery at the base of the towers of Notre Dame of Paris, and that of the portal of Notre Dame of Dijon, or where they are low and stumpy porticos, like the gallery of the facade of Notre Dame of Laon.

The question of art and of proportions in this case dominate the question of service. Yet those galleries always possess utility. In their grang edifices, the architects of the middle ages established means of easy passage at different levels, s so as to be able to oversee and maintain the structures, the roofs and the glass, without being compelled, as one is today, to erect costly and injurious scaffolds, because of the injuries they cause to the sculptures and the delicate parts of the architecture. The two superposed galleries of the western facade of the church of Notre Dame of Dijon (13 th century) are remarkably beautiful in composition and sculpture. We give (6) one of these galleries, surmounted by a high frieze of o ornaments in the fashion of metopes placed between projecting figures. These galleries were destined to connect the bases of the two towers, that have never been erected.

On the exteriors of the Rhenish churches of the 12 th century there frequently extend below the roofs galleries for passage, particularly around the apses. These galleries were then made at the expense of the springings of the half domes of t these apses; they are low, composed of little columns supporting round arches, and they impart richness and lightness to the crowns of those edifices.

We observe that this system is sometimes adopted in the south of France, notably in religious monuments built of brick. Thus at the top of the church of the Jacobins at Toulouse is seen a service gallery, an actual covered gallery, placed beneath the gutter, and that opens into the turrets at the angles of the edifice, and permits passing around the structure near the summit of the vaults. That gallery (7) is lighted f from outside through the round openings B, allowing the examination of the vaults be the little glazed windows C opening

under the side arches; it is supported on great discharging arches D turned from one buttress to another, and perfectly sheltering the glass windows placed at E. All this construction is of brick, and presents a most monumental appearance.

In the interiors of the great Gothic vaulted naves are found above the triforiums, particularly in Burgundy, service galleries passing behind the side arches of the vaults. We see galleries of this kind in the interior of the church of Notre Dame of Dijon, Notre Dame of Semur, of S. Etienne of Auxerre. (Art. Construction, Figs. 78, 79 bis, 88). In the churches of Champagne and of Burgundy, we likewise see service galleries arranged in the side aisles of chapels, above the arches of the ground story, under the window sills.(Art. Construction, Figs. 86, 87).

A gallery of that kind, very beautifully composed, exists around the side aisles of the choir of the abbey church of S. Jean at Sens.[1] Beneath the side arches of the vaults of of these side aisles open triple windows; the gallery passes through their piers as it passes behind the piers bearing the vaults. (8).

Note 1.p.16. Now chapel of the hospital.

We cannot omit here the service galleries that intersect at about two-thirds the height of the side aisles and piers of the nave of the cathedral of Rouen, that pass on arcades around these piers on the side next the side aisle. This singular arrangement, whose motive can scarcely be explained today, seemed quite necessary then (about 1220), for men to believe it necessary to turn arches beneath the archivolts and to give to corbels surrounding the piers considerable importance a and richness. The perspective sketch (9) gives at A the plan of this gallery at the level B of the springing od the arches. At C must have existed a balustrade, whose supports are in p-place, but we believe has never been placed. The nave of the church S. Etienne-du-Mont at Paris, which dates from the 16 th century, presents an analogous arrangement. These galleries can only aid the hanging of the naves on festal days.

On this subject, one will also observe how many architects of the middle ages bring variety into the entirety as in the details of their conceptions. Their flexible methods always give them novel means, when a need is to be satisfied, to ful-

fulfil the different parts of a gentleman.

Galleries on another and private.

Service Galleries of a Palace.

There are frequently established in the terrace and gardens of the middle ages service galleries opening into the private rooms. (Lara. Construction. Fig. 119, 120). These galleries were made of wooden planks. In the form of fortified buildings of the 14 and 15 in Germany, they become merely galleries built for defence, and were then enclosed with machicolations. (Lara. Theories: Donjon: Machicoulis). In the 16 the dwelling the French of these service galleries, they are mentioned when in the inventory of the Malle Carnelaye, also through the galleries, as in the Malle Hotel here. (Lara. Construction. Fig. 120). It are described in corbelling.

In the problem building of the palace of the Doge at Venice, on the side next the quay is found a nearly gallery of the 14 in century. Lost sides overlook in his Malle of the second story. In Fontebuon (10) the great mansion of this family with square walls, and lighted by large window over-land on the court. The gallery of this gallery extend on a covered gallery with battlements and decorated in quadrilla.

This form of service galleries not in Italy and were connected with them. Toward the end of the 14 in century the width of these corridors was increased, and at the end of the 15 in century are done in wide open arcades. That system was definitely adopted in the 16 in century, as one can see in the ambassador Blois, Fontainebleau, (Gallery of Francis I). Chambord, etc. This last were enlarged in windows, sculpture, and furnished also decorations. Gallery was frequently replaced the great hall of the feudal castle.

Naval relates that "in 1422 the duke of Burgfort (Bedfom I) coming by the Tuile at the palace of Guerrellion a long gallery 115 fa. long and 5.4 fa. wide, in the great gallery of the Tuile, choosing the three parts were painted saints; in the corners of a gallery painted with the arms and devices, tooled also silks and in line arches and chases, and arranged on max pieces arranged in six arcs and bases of six sides. Has in good condition," also this gallery, "there are no wooden or bare substituent also had decorated in painting a in the pavement of the pages of the palace of I. Tuile." That gallery

fuffil the different parts of a programme.

GALERIES DE SERVICE DES PALATS.

Service Galleries of a Palace.

There are frequently established in the castles and palaces of the middle ages service galleries opening into the principal rooms. (Art. Construction, Figs. 119, 120). These galleries serve one or several stories. At the tops of fortified b buildings of the 14 th and 15 th centuries, they become covered galleries suited for defense, and were then equipped with machcolations. (Arts. Chateaux; Donjon; Machicoulis). We see in some castles the remains of these service galleries; they are sometimes made in the thickness of the walls themselves, pass through the buttresses, as in the example cited here, (Art. Construction, Fig. 120), or are supported on corbellings.

In the southern building of the palace of the Popes at Avignon, on the side next the court is found a pretty gallery of the 14 th century, that gives entrance to the halls of the second story. We reproduce (10) the cross section of this gallery with pointed vaults, and lighted by little windows opening on the court. The ceiling of this gallery served as au u uncovered gallery with battlements and decorated by pinnacles.

This sort of service galleries end at stairs and are combined with them. Toward the end of the 14 th century the width of these corridors was increased, and at the end of the 15 th century men came to make them actual promenades. That custom was definitely adopted in the 16 th century, as one can see at the chateausof Blois, Fontainebleau, (gallery of Francis I), Chambord, etc. Then they were enriched by paintengs, sculptures, and furnished with benches. Galleries thus frequently replaced the great hall of the feudal castle.

Sauval relates[1] that "in 1432 the duke of Bethfort (Bedford ?) caused to be built at the palace of Tournelles a long gallery 115 ft. long and 9.6 ft. wide; it was named gallery of the guards, because the green guards were painted there; it was covered by a ceiling painted with his arms and devices, roofed with tiles set in lime mortar and cement, and surrounded by six banners enriched by his arms and those of his wife. But in past centuries," adds this author, "there was no mansion more magnificent than that completed by Charles V in the apartment of the queen at the palace of S. Pol." That gallery

was daintily free the balconies in the vents, so as to produce a very full of shade, from trees and flowers, added a-lon sanitary display, the vault far vista and also." Tartra ibal," prefaces Maral, "this Tartra's vestes is to be wee m-ikat a little cottrion through vaion the queen carved so come fun also arrived in the hands of T. Vial. There is also mi-ke a center of silvia full a replica of the Diretion of the ition; if any vaul, our vaula best speed in an above vis, or shats were rudimental haverstay c lapis of mapil, clayed or laurivenna and possible the pattern of her tale. Further, the sky, bpu of the provider act of the sail was Tarsan di-ge (diagramming), worth 10 Para lives the pound, and the whole cost 26 crowns."

Ibid. p.1.17, Plate. 6: Jaine. Ia *villa* ia tarta, Vol. II. p. 291.

The corridors of private houses, leading to more secret connected rooms, were generally arranged in form of a cross or fist with a portico in the inner court, adorned in modern a stage of wood for warmth, for drying linen, etc. These cui-ldina were highly hours of wait in state chambers or halls, and not only the wives of the nobility, T.C to say Tr. (Ibid. Maron).

Ibid. Ibid. Ibid.

A block of a house under the roof, showing for hanging mo-ttoins and hanging lines. Very known of the white area, ma-nually in Kordova Tenan, also the rack of cordyne in T Tais, here hitor under the roofs. (Ibid. Vaiuo).

Ibid. Ibid. Ibid. (Ibid. Tuiaiuraa).

Ibid. Ibid. Ibid.

It was only about the beginning of the 17th century, that vary ulcent pattern and decorativly harmonious as the right of roofs, that the first workers of the mai[illegible] ofw. ra-ter face roofs of harvest fall linearly on the public street by means of the decoration given to the corniss. (Ibid. Dhum-an). At the catastral of Para in the time of Maurice de Sully, i.e., the completion of the choir in 1163, there were matrum pattern mat[illegible] later on the [illegible] 1213.

was painted from the wainscot to the vault, so as to represent a grove full of plants, fruit trees and flowers, among which children played, the vault was white and blue." Besides that," continues Sauval, "king Charles V caused to be acso painted a little corridor through which the queen passed to come from here oratory to the church of S. Paul. There at both sides a number of angels held a curtain of the liveries of the king; of the vault one could best speak op an azure sky, on which were represented descending a legion of angels, playing on instruments and chanting the anthems of Our Lady. Further, the sky, both of the corridor and of the hall were German blue (ultramarine), worth 10 Paris livres the pound, and the whole cost 26 crowns."

Note 1.p.18. Hist. et antic. de la ville de Paris. Vol. II. p. 281.

The corridors of private houses, intended to serve several connected rooms, were generally arranged in form of a shed r roof with a portico in the ground story, adapted to shelter a store of wood for warming, for drying linen, etc. These galleries were lightly built of wood on stone columns or posts, and had only the width of the corridor, 3.3 to 4.9 ft. (Art. Maison).

GALETAS. Attic. Garret.

A story of a house under the roof, intended for keeping provisions and hanging linen. Many houses of the middle ages, especially in southern France, where the need of coolness is f felt, have attics under the roofs. (Art. Maison).

GARDE-CORPS, GARDE-FOUS. (Art. Balustrade).

GARGOYLE. Gargoyle. Spout.

It was only about the beginning of the 13 th century, that were placed gutters and consequently gargoyles at the edges of roofs. Until then the first centuries of the middle ages, water from roofs or terraces fell directly on the public street by means of the projection given to the cornices. (Art. Chenau). At the cathedral of Paris in the time of Maurice de Sully, i.e., the completion of the choir in 1190, there were neither gutters nor gargoyles; later on the same edifice about 1210,

the water in the gutters ran over the projection of the crown moulding by means of grooves sunk at certain distances. We see gargoyles appear about 1220 on certain parts of the cathedral of Laon. These gargoyles are wide, not numerous, composed of two courses, one forming the groove and the other the cover. (1). But laready these gargoyles affected the form of fanciful animals, rudely cut, as if to allow their construction to be seen. The architects of the 13 th century soon recognized, t that there was a considerable advantage in dividing the water= spouts. That indeed avoided long slopes in the gutter, and reduced each stream to a very small streamlet of water, not able to injure the lower construction. Thus the gargoyles were multiplied, and in increasing them they could be cut finer and more slender, and the sculptors took possession of those projecting stones to make an ornamental motive for the edifices. The diversity of forms given to gargoyles is prodigious; we do not know two of them alike in France, and our monuments of the middle ages are covered by them. Many of these gargoyles are masterpieces of sculpture; there is an entire world of animals and persons composed with great energy, alive and boldly cut by skilful and assured hands. These beings are skilfully attached to the crown mouldings, belonging to the architecture and give to the outlines of the edifices a particular character, marking their salient points, accenting the heads of the buttresses and emphasizing vertical lines. One can judge of the skill of architects and sculptors in the combination and execution of these spouts by the difficulty experienced in combining and executing them. In modern imitations made on Gothic edifices, it is very rare to see gargoyles, that are happily joined to the architecture; they are either badly placed, heavy or too slender, of soft forms, poor in invention or without character; they do not have that real appearance so remarkable in the old examples; they are impossible beings, o often ridiculous, gross caricatures without style.

Certain limestones of the basin of the Seine, like the "clinquant" lias, lend themselves marvellously to the sculpture of these long blocks of stone projecting from the structures. There was indeed necessary a material firm enough to sufficiently resist in these conditions all causes of destruction, that hasten their ruin. Thus it is at Paris or in the provinces

where is found the line, as for example in Amiens, that one can also collect the most beautiful examples of architecture. In Parisian school of sculpture of Paris in the middle ages a certain has an inseparable interrelation with the different forms, particularly in also concerns statuary.

Statues are particularly realized at Paris about 1240; at Reims then we see appear in the upper portion about 1270 a lacunlike, rigid shape, not already one is artist made.(3). These elated as one with of the passage of the first Gothic period at the nave, and that are beside of the door which, an already larger and more elegant, relieved by pretzels and similar shapes so as first frees leaves from the face of the building. (4).

In the 3. Chapelle of the palace at Paris, the porphyries are more slender and more graceful; these are not only the bases of minels, but are entire minels elegant in the upper arms modified by their form. Their bases are diversed in their value as far as possible from the valley of the buttresses. (5). One of these porphyries were effectively sculptured in a miraculous relief.

In this indicated in art. Italy, for the Italian architecture in that time still the great values of the nerve, approved a successfully basing in the monopoly of lower realm, also material products to enter the remainder from the first quarter. Italy has other tendencies in construction of the terrestrial roof. Italy has other tendencies towards towards statement, also the arcade triforia are lined, by means of a nearly vertical but less ambitious from the height to the triforia. Here (6) is one of these features with basic vau, taken from the upper part of the cathedral of Amiens. (About 1235).

The porphyries are typical in each aid of the triforia in the 3. Chapelle of Paris, as appear the well of the apse of Paris, and around the cornice of the choir that of Paris or lower cross the area of these buttresses, as at d. Features of Terrenoyes (d) is at each (lower ellipse of the it as at (d) the reaction, and then lower part as a curve(8); or lower trees on the main lancelives of these buttresses, as around the chapels of the ability of the criminal of Clermont. (7). (End of 13 th century).

Equal lack also the connection of particular features were

where is found the lias, as for example at Tonnerre, that one can also collect the most beautiful examples of gargoyles. Be Besidesthe school of sculpture of Paris in the middle ages c certainly has an incontestable superiority over the adjacent provinces, particularly in what concerns statuary.

Gargoyles are systematically employed at Paris about 1240; at Notre Dame we see appear on the upper cornice about 1225 g gargnyles, still short, but already cut by skilful hands.(2). Those placed at the ends of the channels of the flying buttresses of the nave, and that are nearly of the same epoch, are already longer and more slender, relieved by corbels that allow them to be given great lengths from the face of the buttress. (3).

At the S. Chapelle of the palace at Paris, the gargoyles are more slender and more developed; these are not only the busts of animals, but are entire animals attached to the upper crown moulding by their paws; their heads are diverted to throw the water as far as possible from the angles of the buttresses. (4). Some of these gargoyles were evidently sculptured by c consummate artists.

We have indicated in Art. Cable, how the Gothic constructors when they built the great vaults of the naves, arranged t temporarily basins in the spandrels of those vaults, with external gargoyles to throw the rainwater from the flying buttress until the completion of the permanent roofs. These temporary gargoyles themselves became permanent, when the upper gutters were placed, by means of a nearly vertical duct descending from the gutter to the gargoyles. Here (5) is one of those gargoyles with double end, taken from the upper part of the cathedral of Amiens. (About 1235).

The gargoyles are doubled at each side of the buttresses as at the S. Chapelle of Paris, as around the hall of the synod of Sens, and around the chapels of the choir of Notre Dame of Paris; or they cross the axes of these buttresses, as at S. Nazaire of Carcassonne and in so many other edifices of the 13 th and 14 th centuries, and then they rest on a corbel(6); or they rests on the heads themselves of those buttresse, as around the chapels of the choir of the cathedral of Clermont. (7). (End of 13 th century).

About that time the composition of gargoyles becomes more c

Note 1.p.27. From Notre Dame of Paris.

complicated, that human figures often replace those of animals, as may be seen in the last example, which shows us a winged demon appearing to carry off a small nude figure.

There exists around the monuments of this epoch a good number of gargoyles, that are veritable pieces of statuary. Church S. Urbain of Troyes has at the tops of the buttresses of the apse very remarkable gargoyles; we give one of them.(8).

During the 14 th century the gargnyles are generally long, already slender and charged with details; in the 1, th century they become yet more slender and take a character of strange ferocity. Although the details are refined and often too numerous, yet their mass retains its frank charm and an energetic outline; the paws and wings of the animals are properly attached, and the heads are studied with care (9, 9 bis). These important parts of the sculpture of the middle ages have always been treated by skilful hands; they reserve till very late their original character, and yet in the first times of the Renaissance are seen on the edifices gargoyles, that retain the style of the 15 th century. Only during the second h half of the 16 th century did the sculpture absolutely reject the old forms given to the ejectors to adopt figures of chimeras recalling certain antique figures, consoles, or simple stone pipes in the form of spouts.

During the middle ages gargoyles were not always sculptured; sometimes in places where not exposed to view, the gargoyles art only blocket out. There are a great number of that sort that assume a very simple form (10).[1] Gargoyles are common in Ile-de-France, Champagne and on the banks of the lower Loire; rare in Burgundy, the centre and South of France; or if found on the monuments beyond the Loire, this is because they belong to edifices erected in the 13 th, 14 th and 15 th centuries by architects from the north, like the cathedrals of Clermont, Limoges, Carcassonne (S. Nazaire) and Narbonne. Where hard m materials are not common, as for example in Normandy, gargoyles are short and rarely sculptured, or are entirely wanting, the water descending from the roofs without gutters.

Note 1.p.27. From Notre Dame of Paris.

Lead gutters placed on civil or religious edifices also had their gargoyles of metal. We have very few today of that sort from an epoch before the 16th century. Here is one (11) to be

seen at the corner of a house at Vitre; it dates from the 15 th century, and is made of hammered lead (Art. Plomberie). We know ~~sfne~~ gargoyles of the middle ages of terra cotta. On brick edifices the gargoyles are of stone, as may be seen on the Jacobins of Toulouse, college S. Remond, and on many other old edifices of the same city.

GAUFFRURE. Gauffer. Stucco Recief.

Application of mortar on stone or wood forming raised ornaments, relief grounds, usually gilded. (Arts. Application; Pe Peinture).

GIRON. Tread. Travel line.

Width of the step of a stairs. The travel line is said to b be straight, when the tread is of equal width for its entire length; triangular, when the step is inclosed in a circular wall. Then the travel is measured at the middle of its length.

GIROUTTE. Weathervane.

A place of iron or copper and fitted with a tube or two rings, rotating about an iron rod placed at the summit of a roof. D During the middle ages not everyone was permitted to place w weathervanes on the roofs of habitations. The weathervane was a mark of nobility, and its form was not optional. "Gentlemen," says Lafourer,[1] have the sole right to have weathervanes on their houses; they are pointed like pennons for simple knights, and square like banners for knights bannerets."-- "It is known," also sasy S. Palaye,[2] "that the first act of possession of a fief or domain, a place taken in war, was indicated by the b banner of the new lord, placed on the most permanent place, on the highest tower." Old weathervanes are rare; they were usually painted with the arms of the lord, or were cut out so as to show the parts of those arms; they were sometimes surmounted by a crown, but that was toward the end of the 15 th c century. Most of the old vanes are so arranged that a solid portion is maintained in equilibrium by counterpoises, so ar to facilitate rotation on the iron axis. (1). The vanes of t the middle ages are small, placed high on iron rods and accompanied by lead terminals. (Art. Epi). The hospital of Beaune still retains the old vanes of its roofs, painted with the a

arms of Nicolas Rollin, chancellor of Burgundy (1441); these vanes are square with a single counterpoise, and decorated at the two corners by cut-out leaves. Here is one of them (2). We also saw in 1833 on the chateau of Amboise vanes from the beginning of the 16 th century with the arms of France perforated and crowned. (3). All French citizens could long since place vanes on their houses, and they did not fail to do so.

Note 1.p.29. Origines des armoires. p. 93. (See Solocing, Chombolas and la Petrere.

Note 2.p.29. Memoires sur l'ancienne chevalerie. Vol. I.p. 360. (Notes).

GNOMON. Gnomon. Hand.

A rod fixed in a slab and giving the hour of the day by the shadow cast on the dial. We see in the Olim, that in the 13 th century there were dials on the main roads. Louis IX in 1267 caused an inquiry to be made by a certain knight, Guiters de Vilete, bailiff of Tours, and a canon of Loches, Theobald de Compans, to know if the king had the right to remove stables of horses fixed on the ground and sundials supported by columns, all things that obstruct the roads. We see sundials from the 14 th and 15 th centuries on the angles of certain edifices of the middle ages, notably at the angle of the old tower of the cathedral of Chartres, and at the corner of the cloister of the cathedral of Laon. (Art. Cloitre, Fig. 16).

GOND. Hinge-pin.

Piece of bent iron with flange built into stone, whose cylinder or slightly conical pin enters the eye of a hinge strap of the door. (Art. Serrurierie).

GORGE. Hollow. Overmantle.

A concave moulding. The name was also formerly given to the part of the hood of a fireplace comprised between the lintel and the crowning cornice beneath the ceiling.

GOTHIQUE. (Architecture). (Art. Architecture). Gothic architecture.

GOUSSET. Brace.

A timber placed diagonally to strengthen the bracing of sides, framed to form a right angle. (1). A is a brace.

CONT. Table.

A use of words said:- "The lack of taste leads to crime." The saying being true in our opinion, we are surrounded by a civilized,yet not disposed to become wise. Taste is the merit of the beautiful and has proof to be a sign of taste. It is a keen sensitive to distinguish most from evil, beauty from ugliness. The root (for definitions are not wanting, if the quality is rare) is also the reason for the time; as to not which that use can be an argument of taste without being a sen of taste, for taste is not a corporal substance, like the spirit of the soul, but a reasoned development of the intellectual faculties. To want in the total a master of artistic art, who says no taste in point of basic colors, and some assert that are men of taste without having studied the arts. In general good artists,painters are regarded as sculpture, as sculpture taken influence in perfection. To copy in an art more than opinion, but is relative that if taste will note a place in frame, it is still tempting to the object that on any text attraction. To only claim have no sound of expressure. To insist claim that a student observe constituent in terms, good artistic, more dangerous in colour reasonable not reversed, can yet take into its notes. In sen of taste type not its to use correction. In to wiggness the to towards by the such natural sense. To sure taste in the eye is to have the hue, to view has to express it simply; it is to place moderation, always extent; to allow the most vis- if use to appear, with the reason, efficient, instructed in person. Then if this moral side is any, reason to theatre, instructive air the and the air is rather or object, it is fit- fitself for taste to be satisfied.

Good taste lies there. We are obstacles but persuasion, and the day when are have said: "Here is the standard of good taste," we will be satisfied by your affirmation, more than that is necessary; it is remarkable for this procedure of good taste to be interest not proved by the listing among if a year criterion with the fact that they state. If that criterion good, taste is lacking, however beautiful the fact

A timber placed diagonally to prevent the bending of timbers framed to form a right angle. (1). A is a brace.

GOUT. Taste.

A man of sense said:- "The lack of taste leads to crime." The saying being true in our opinion, we are surrounded by c criminals,or men disposed to become such. Taste is the habit of the beautiful and the good; to be a man of taste, it is t then essential to distinguish good from evil, beauty from ugliness. The good (for deficintions are not wanting, if the quality is rare) is also the respect for the time; we do not admit that one can be an artest of taste without being a man of taste, for taste is not a corporeal advantage, like the s skill of the hand, but a reasoned development of the intellectual faculties. We meet in the world a number of skilful artists, who have no taste in spite of their talent, and some amateurs that are men of taste without having practised the arts. In general among artists,amameurs are regarded as scourges, as usurpers whose influence is pernicious. Not only do we not share that opinion, but we believe that if taste still holds a place in France, it is still chiefly to the public that we owe that advantage. We only claim here to speak of architecture. We cannot admit that an architect obeying restricted interests, mean prejudices, whose character is neither respectable nor respected, can put taste into his works. The man of taste does not lie to his conscience, but he expresses his th thoughts by the most natural means. To have taste in the arts is to love the true, to know how to express it simply. it is to reject exaggeration, always untrue; to allow the moral side of man to appear, with his reason, affections, tendencies and purpose. Then if this moral side is weak, reason be obscure, tendencies are low and the aim is vulgar or odious, it is difficult for taste to be satisfied.

Good taste like truth, is not obtrusive but persuades; and the day when you have said; "Here is the expression of good taste," men will be satisfied by your affirmation, more than that is necessary; it is requisite for this expression of good taste to be discussed and proved by the intimate accord of y your principles with the form that they adopt. If your principles are bad, taste is lacking, however beautiful the form

may be, make the form express the language of the idea, and you will be an artist of taste; yet it is necessary to have good ideas and to express them in good forms.

It has already been thought for a long time, that it sufficed to make proof of taste by adopting certain recognized beautiful types and never departing from them. That method, accepted by the Academy des Beaux Arts in what concerns architecture, has led us to take for the expression of taste certain trite formulas, to exclude variety of invention, and to place outside the law of taste all artists, who seek to express new needs by new forms, or at least subject to new applications.

Since the 17 th century have been placed in honor many hypocrises, and we have the hypocrisy of taste, as we have religious hypocrisy. Those are discoveries that rigorously, we should be beyond. But just like religious hypocrisy, i.e., the external practice of formulas without principles, leading to unbelied and corruption, so the hypocrisy of taste conducts to depravity, and while the Academie des Beaux Arts compels its initiates to submit to formulas, whose sense it does not explain, we see around us it devote itself to the strongest shamelessness, not only outside the sanctuary of the initiated, but within their sanctuary itself. Taste (in architecture) in instead of being a law proceeding from a true and genesal principle, accepted by all and applicable to all things, has become the privilege of an exclusive school. For example, it has been agreed, that the orders of Roman antiquity were works of taste, which we admit without objection, if those orders have any reason for existence; which we do not admit of nothing justifies their use. Art being reduced to certain practices declared alone to be orthodox in the matter of taste, is atrophied, descending a sted at each generation of initiates; one becomes an architect of taste by following a rut ever narrower and deeper, on the condition of never leaving it. Some architects perhaps find an advantage in that, for nothing is more pleasant and easy in the arts, than to belong to a powerful society; but one can affirm that art has lost by this. With t the Academie des Beaux Arts, the jealous guardian of taste f for a very long time as it asserts, architecture, still so alive at the middle of the 17 th century, has gradually fallen into feebleness, that has led us to gradually fall into anarchy,

to blind obedience or to revolt. But as for taste, good taste, i.e., that exact knowledge of needs, of the genius of our civilization, that true and temperate expression of what it has the right to demand from us, it is necessary to seek long to find it; and if by chance this taste for the true appears, it astonishes the multitude, and arouses censure, if not the wrath of those, who offer themselves as the sole depositaries of sound doctrines.

Every architectural form that cannot be given as the consequence of an idea, a need or necessity, cannot be regarded as a work of taste. If there be taste in the execution of a column, this is not a reason that the colonnade of which it is a part is a work of taste; since for that it is necessary for that colonnade to be in its place, and to have a reason for existence. If it be said; "this palace is badly arrauged and inconvenient; the services are not in their palaces, the rooms are dark, the construction is vicious, but it is decorated with taste," that is nearly as if one claims that a book is f full of eerors, the ideas of the author are confused, his subject badly developed, but that it is written with elegance. The first law for a writer is to know what he wishes to say and to make himself understood; clarity is one of the conditions of taste in literature as in architecture. To express his ideas clearly, and elegantly, he must have ideas, and it is necessary for these ideas to precede the form that must s serve to express them. But on the contrary, if we preoccupy ourselves with the form before knowing what it should express, we make no proof of taste. If the porticos of the Romans erected on public places; if those vast monuments accessible to the multitude, permitting circulation of air and light in a fine climate, marked the taste of the masters of the world in urban structures, the colonnade of the Louvre erected above a ground story and inaccessible to the public, sheltering the rare passer through it from neither sun nor rain, and not being in relations to the proportions and dimensions of the other parts of the palace, cannot reasonably pass for a work of taste. If desired, we indeed admit, that the order is studied w with taste, i.e., that it is in harmonious proportions with itself; but that portico is in very bad taste, as a portico applied to a palace. "But this is not the place."

Happily for art, there are times when taste does not need to be defined; by that it even occurs that the art is true, t that it is submissive to the instructions of reason, that it does not repudiate its origin, and only speaks when there is something to say. In those times men are not preoccupied in giving the rules of taste, no more than among upright men they are not occupied in discussing what is lawful and what is not so. Men commence to speak of taste when taste has fled f from art to take refuge in the minds of rare artists; books o on virtue are written only when vice dominates. Those happy times are far from us; they existed among the Greeks of antiquity, they were brilliant during the middle ages, perhaps they might be revived on condition of admitting, that taste consists in the observation of very simple principles, not o in the preference given to some form in preference to another. When taste is restricted within the limits of a coterie, however powerful one wishes to assume it, this is no more than a sad pretension from which all tend to free themselves; for taste, good taste has the privilege of imposing itself in all times and in spite of prejudices, just like anything proceeding from truth. But today men scarcely understand what is taste. Concerning architecture are professed veritable heresies in t the matter of taste; daily are given as models of taste works, whose sense it is impossible to comprehend, that are only notable for complete discord between purpose and appearance. One says to us that this facade is in good taste; but why? Is it because all its parts are symmetrical; that it is ornamented by columns and statues, that numerous ornaments are scattered everywhere? But the external symmetry conceals very different services; here is a great hall, there a cabinet, farther on is a stairway. This window that lights the chamber of the master is of the same height and form as that opening on a c corridor. Do these projecting columns indicate partition walls, or do they take the place of buttresses? But the division walls are placed beside those columns and on their axes; buttresses are superfluous, since the floors do not rest on this f front wall. We see niches hollowed in the middle of piers, w where we need to find a point of support. If we ridicule persons desiring to appear other than as they are, if we despise a man that seeks to impose on us concerning his rank, his place

in the world, and if we find his manners in very bad taste, why do we find taste in erecting the facade of a palace befo. re offices for clerks, in placing colonnades before walls where not needed, in constructing porticos for promenaders that do not exist, in concealing roofs behind acroterias as an inconvenient thing, in giving to a mayor's offices the appearance of a church, or to a palace of justice the appearance of a Roman temple? Taste is not as some believe it to be, a caprice more or less happy, the result of an instinct. No one is born a man of taste. On the contrary, taste is only the impression left us by a well directed education, the crown of patient labor, the reflection of the atmosphere in which one lives. To know and see only beautiful theory, to be nurtured on and compare them; to arrive by comparison to selection, mistrust judgments ready made, seek to discover the true from the false, flee mediocrity, fear infatuation, these are the means of forming one's taste. Taste is the consideration; it is only acquired after a long time by observation, never exceeding t the limit of the true and just, and never trusting to chance. Like honor, taste never endures any blemish, error, any low concession, no forgetting what is due to others and to one's self. Respect for the public on the part of an artist, who p produces a work, is the mark of taste. Now sincerity is the best mode of expressing respect. If deception was ever permitted, this would be toward those that scorn one. Yet we are far from the rules of taste at this point in the art of architecture, when we show to the public only appearances. We imitate stone with plastering or cement, marble and wood by painting. Those vaults that you believe to be carved stone are only plastering on laths; those oak panels arepine boards covered by coatings of surface decoration; those pilasters of m marble and gold, that appear to support a cornice and sustain a ceiling, are slabs of plaster attached to a wall loaded by their useless weight. Even those ceiling coffers, that represent to us panels in joinery, are nothing but cast mouldings suspended by iron ties from a rough floor, that has no relation to that decoration; so that in that hall in which you believe that you see the workmanship compete with the richness of the materia,, all is deception. Those piers that seem to support are themselves attached like paintings; those arches

conceal wooden or iron lintels; that vault is suspended from a floor that it weakens; those marble columns are cylinders of stucco enclosing posts. The artist is a man of taste, you say; yes, if to make proof of taste is to mock you and to deceive the public in regard to the quality of the work.

Yet how did these artists of the middle ages in France proceed, accused of bad taste by the wits of the 17 th and 18 th centuries, little acquainted with architecture, and by our feeble modern schools, copying in pasteboard and plaster the robust splendors of those latter ages, imitating imitations through weariness and fatigue, for lack of principles and convictions, till the imitation style of the time of Louis XVI, as if the art of this time of weakness had a style? As if to come to that sad extremity it was necessary to send our young architects to Rome and Athens to be inspired by the arts of antiquity?

A first law was sincerity. Had they stone, wood, metal, stucco to be used in the work? They gave to each of these materials the structure, form and decoration suited to them; and even when they had attempted to impose on one of these materials f forms borrowed from the others, taste traced for them the limits that should not be passed, for they never sought to deceive by appearance. One can indeed find that a certain rose w window and certain tracery are delicately wrought; no one would take a rose window in stone or tracery of stone for wood or iron; again these details of religious edifices are merely openings, accessories that do not concern the actual construction, for one would recognize that without being an architect. For them a hall is a hall; a house is a residence; a palace is a palace; a church a church and a castle a castle; it would never have come into their minds to give a municipal edifice the outlines of a church as a pendant, to amuse idlers and g great lovers of symmetry. Did they cover that hall by a tunnel vault of wood? That is indeed a ceiling that we see, not at all the image of a masonry vault. Did they make a ceiling? The construction of the floor gives its compartments and decoration. In their opinion, a roof is made to cover an edifice; so they gave it sufficient inclination to remove the water; they did not conceal it behind an attic; on the same palace they did not erect flat and steep roofs; they adopted either

everywhere according to need, climate or the nature of the c covering. Does a gallery pass behind this wall? We recognize it on the exterior by the manner in which the openings are made; is this a great hall? The windows will be high and wide; is this a row of cells? The windows will be frequent and small. Starting from true principles, simple and reasoned, taste is no longer a matter of chance; it is attached to something real; it brings into the study of details a respect for the truth; it is pleased to express the needs and requirements of the programme; it varies its expression at each instant according to the theme given to it. To know how to say only what is necessary, and to know how to state things properly, is a proof of taste in the relations of the world; it is a mark of taste to give a house of a simple private man, occupied by tenants, the appearance of a palace? "If the owner can pay for this luxury," you say, "why not satisfy him?" Maybe; but you cannot help finding that the architect and his client have bad taste, and the extravagance of the latter does not excuse the compliance of the former. A building ordinance is not written in the style of a discourse at the Academie, an inventory in the style suitable for a romance; and the letter that you address to your gardener to advise him to plant salad herbs at the proper time is not like that you would write to a prince to request his good will. Why then, if we admit these distinctions in the manner of writing, should we not observe them in our architecture? We find in the art of the middle ages that propriety, the mark of an assured taste. The village church does not resemble a cathedral; it is not a diminutive of the latter. The house of a citizen is not built with the appearance of a palace. The city hall cannot be mistaken for a festal hall, or the hospital for a city hall; and the stranger that formerly walked in our cities could divine the purpose of each edifice from its external appearance; it would never occur to him to seek a holy water stoup at the door of a mayor's residence, believing that he entered a church, or to ask at the vestibule of a barrack, the name of the rich lord for whom was erected that majestic edifice.

Taste relates to the object, then first of all it is based on reason. As good sense is one of the (very ancient) qualities of our country, we have brought into our arts a delicate

taste, when we have been left to our own instincts. Unfortunately architecture has long been embroiled with good sense in France and consequently with good taste, under the influence of erroneous doctrines. It was recognized in the 17 th century, that antique architecture was an art subject of pure taste, which is incontestable; men set themselves to produce antique architecture without thinkgin that if antique architecture is conformed to taste, this is because it is the clear a and precise expression of the civilization, that produced it. But if by that even antique architecture submits to the rules of taste under the Roman emperors, it is contrary to those r rules of taste in the society of Louis XIV, which does not exactly resemble the society of Tiberius or Claudius. Then ((in the 17 th century) reasoning scarcely entered into questions of art; architecture was an affair of colonnades, capitals, pediments and cornices, of symmetry, all things declared to be in grand taste, as then said, which without defining f farther what was meant by grand taste, which in our opinion is only a grand infatuation. Yet (for this is an occasion to make proof of taste, and to not fall into exaggeration), it is proper to recognize that this century (we speak of that of Louis XIV) knew how to produce in architecture works of great worth, every time that it did not entirely abandon our French sense. Certainly, one cannot deny that the hospital of the Invalids, for example, is a masterpiece of architecture. Why? Is it because we find there Roman archivolts and cornices? Certainly not: it is because that edifice presents a plan perfectly appropriate to the object; everywhere is grandeur without lost space, convenient services, a general external appearance that clearly indicates its purpose. But to whom do we owe those magnificent arrangements? To Roman antiquity? Did Roman architects give us with other things that beautiful composition of the court with its four stairways at the angles, around which extends the cloister? No, that is the plan of a French abbey c cloister with its vast refectory, its dormitories, its church accessible from all parts of the buildings, its galleries and its daily services. By these arrangements suited to the purpose of the hospital of the Invalids is a work of taste, and n not because the architect has scattered some Roman mouldings on its facades; on the contrary, those details borrowed from

an architecture entirely foreign to our climate, our customs and our genius, only injure a monument, or at least render it cold and monotonous. Those roofs with steep slopes (that are really French) clash with those antique cornices, with those arcades that have the great error of desiring to recall some Roman portico of a theatre or amphitheatre. In that taste cannot be satisfied, for taste demands also a relation, a correlation of the entirety and the details. When Moliere took from Plautus the subject of his Amphytrion, although he adopted t the antique canvas, he has made morning, night, Jupiter, Amphytrion, Alcmene and Sosia, speak like the lords, ladies and servants of the courts, and not like Greeks. Even more, he gave his personages the sentiments, ideas and prejudices of h his time; to express those ideas and sentiments, he has not tacked Greek and Latin words to his French phrases. The names od the personages have nothing to do with the matter, aud Jupiter could call himself Louis the Great and wear a great wig. Certainly Moliere, like all other illustrious authors of the 17 th century, greatly appreciated the ancients, and knew how tc use them; did he cease thus to be French, and if we admire him, is not this because he is truly French? Why then in architecture alone is it permitted to one to express himself like a Limousin pupil of Rabelais, and how does that jargon be conformed to the rules of taste?

Stone, wood and iron are the materials with which the architect builds and satisfies the needs of his time; to express his ideas he gives forms to these materials. those forms are not and cannot be due to chance, they are produced by the requirements of construction, by the needs themselves that the architect is bound to satisfy, and by the impression that he desires to make on the public; this is a sort of language for the eyes; why admit that this language does not correspond to the idea, either in entirety or in details? How admit also that a language composed of members without relations to each other can be understood? This confusion introduced in the 17 th century soon made architecture an art unintelligible to t the public; we see today more than ever the sad effects of this.

From the thoughtless introduction of certain forms and not of the spirit of antiquity in architecture, men soon came to the corruption of these forms, whose principles had not been

recognized at first. In the 18 th century men still believed that they employed Roman arts, while they only increased the disorder introduced in the study of architecture. Yet taste and a conventional feeling is so natural with us, that even in that disorder are found traces of that French quality. Our chateaus and public edifices of the last (18 th) century have a certain air of calm grandeur, of reason, very far from the exaggerations found then in similar edifices built in Italy or Germany. One of the most visible signs of the confusion in minds since that epoch is the small part allotted to taste in architecture. Taste has become a matter of detail, of fugitive charm, scarcely appreciable, that cannot be defined and vague, and thenceforth cannot be regarded by us architects as the r result of invariable principles. Taste has been merely a slave of fashion, and it was recognized that artists recognized as possessing taste in 1780 no longer had it in 1800. That depreciation of taste, for example, caused it to be said that such an artist possessed neither the theory nor the practice of h his art; in brief, that he was tolerably ignorant, but that he had taste. Is it then possible to make proof of taste in architecture without being profoundly versed in that art? As proof of the depreciation of taste, we shall cite a serious and enlightened author, and see what he says concerning taste.[1] "Likewise for all that relates to the imitation of the fine arts,[1] the faculty called taste is chiefly credited in agreeable qualities, in the choice of a certain manner of beauty, or of working, that feeling alone comprehends, and that no analysis can demonstrate." This is embarrassing, for it says that "no one can dispute about tastes," since he cannot demonstrate whether those exist or not. And further:- "Taste is not that which in composition causes one to discover those ground systems of arrangement, those fortunate lines or imposing masses, that seize on both the mind and the eyes; but it will frequently be what mingles with these combinations the charm of facility, from which results the appearance of spontaneous creation." Thus we see that for one of the most distinguished authors, that wrote on the art of architecture at the beginning of this (19 th) century, taste is indeterminate; it does not preside over the general arrangement, it is called on by the artist only when the work is conceived, and when it is only

necessary to give an attractive turn, i.e., in good French, when necessary to subject it to the requirements of the fashion of the day. It was indeed a trouble to speak or write on taste for two centuries, and found academies designed to maintain the rules of taste, to arrive at this conclusion:- "The charm of facility, the manner of being and doing that feeling alone comprehends!

Note 1.p.38. Quatremere de Quincy. Dictionnaire d'architecture. Art. Gout.

Note 1.p.39. What is this imitationof the fine arts? Does the author desire to speak of imitation or of the imitation of nature in art?

Reducing taste to these pretty and temporary functions, it has been necessary to reduce those, who are regarded as the depositaries of taste. Thus architects soon saw a certain part of public edifices leave their hands, since taste sees nothing in the great systems of arrangement, in imposing masses." Men have thought that their aid was useless, if it concerned the building of bridges, and constructing quays, making great terraces, barracks and military works. And if the public finds most of these buildings ugly, ungraceful and even barbarous, one can say that taste is nothing in them, and that the public is not to seek it there. Well our architects of the middle a ages were in accord with the public of their time, and believed that taste appeared as well in the construction of a bridge or a fortress as in the ornamentation of a chapel or a bedroom; for them taste governed the conception and general arrangement as well as the details of the architecture, and one could even recognize that general quality in the matter was found even during the 17 th century. It suffices to see how were conceived the chateaus of Vaux, Rincy, Berny, Versailles, Monceaux, S. Germain, Chantilly, their parks and dependances, to be assured that taste in the architects, who directed the construction and arrangement of these residences, was not merely a q quality connected with the details, an indispensable manner "that feeling alone comprehends, and that no analysis can demonstrate," but on the contrary the result of good traditions, of knowledge, of general views both just and broad, a result whose causes and effects could be demonstrated. It is rather in the general arrangements, that the architects of the 17 th

century show their taste then in the execution of the details. In fact taste is manifested in all and directs all, in the m midst of civilization in conditions proper for their development. There is as much taste in the composition and order of the Parthenon, in the manner in which it is planted on the A Acropolis of Athens, as in the design and execution of the mouldings and sculptures.

Now see how the architects of the middle ages in France have manifested this essential quality. As we have said above, truth is the first condition of taste. If the architects of that time possessed bricks for building, their construction will n not imitate an edifice of cut stone; they would adopt not only the construction but the decoration furnished by the bricks; avoiding strong projections in belts and cornices; they would not produce the effect by sculpture, but by the masses naturally given by the surfaces of terra cotta covering concrete. Also the brick monuments erected by the architects of the middle ages recall certain Roman structures of the time of the empire; employing the same procedures, they were led to recall the same forms, although then the habits of constructors were very different from those of the Romans. They emphasized the grandeur of those simple masses by lines, delicate but much accented in their details, such as they could compose with bricks set diagonally and corbelled. If they mix stone with bricks, and if stone is scarce, they use it only for monolithic columns, capitals, cornice slabs, sills of windows, jambs and archivolts. The mort costly the material, the more they know how to enhance the value by workmanship. Economic in materials (which is also a proof of taste), they do not lavish them uselessly, but select them according to the function to be fulfilled, the place to be occupied. In the same edifice we shall see monolithic columns, whose transportation, cutting and setting must have required much time, care and trouble, s supporting structures of small materials, raised and set by hand. Faithful observers of the principles of their construction,[1] they desire these principles to be apparent: their jointing is not only a science, but an art that they wish to be appreciated, that is addressed to the eyes, explaining to all the procedures employed without the necessity of being initiated into all the secrets of the practician. Never does the c

construction disguise its means; it does not appear to be other than it is. Thus (and this observation all can make) the edifice of the middle ages gains rather than loses by showing its jointeng, the joints and beds of its structure; can one say as much of edifices built since the 18 th century? On the contrary in most of these monuments, is not the actual construction in such discord with the forms, that one is compelled to seek means suitable to disguise it? For example, can one imagine the colonnade of the Louvre with joints and beds as frankly accented as they are on the facade of Notre Dame of Paris? Then in that one cannot deny to the architects of the middle ages that they are true. One will perhaps object to this; that the Greeks and even the Romans did not accent the jointing, as a means of construction, the details of the structure, and st still one cannot claim that they have thus lacked taste in ce ceasing to be true. The Greeks and Romans, when they employed stone or marble, had in view the erection of edifices that a appeared all in one piece; they set stones with perfect joints and without mortar between them, so that the joints remained invisible. Among the Greeks the idea of giving to an edifice the appearance of homogeneous material, as would be a monument cut in the rock, was dominant to the point, that if they could not use materials of extreme fineness and purity, when they built in stone and not in marble, they covered that stone with fine stucco, which absolutely concealed those scarcely visible joints and beds. Now we have adopted, or believed that we adopted the forms of the architecture of the Greeks and Romans, and we construct like the architects of the middle a ages, setting stones on mortar or plaster. Then we do not make proof of taste, since our construction is visible in spite of our efforts to disguise it, and that we adopt forms evidently changed if the jointing remains visible. If then in construction to show taste it is necessary to be true, the ancients like the artists of the middle ages were men of taste, and t today we cannot claim the same advantage.

Note 1.p.40. Art. Construction.

Let us pass to the general arrangement. One cannot deny that our churches of the middle ages, large or small, perfectly f fulfil their purpose; that the plans of those edifices, most frequently borrowed from the Roman basilica, but profoundly

modified according to needs and means of construction, were w well conceived, since then nothing better had been found, and that even in the time when the architecture of the middle ages was regarded as a barbaric art, men did nothing but copy these plans and always spoiling them. The beautiful arrangement of the sanctuaries wit side aisles, that belongs to the middle ages, must iufallibly produce a very grand effect. That arrangement is simple, easy to understand, favorable to the development of the ceremonies of worship, and to the most sumptuous decoration. Eveeywhere is easy circulation, air and light. If in the castles of the 13 th, 14 th and 15 th centuries these symmetrical arrangements are not found to be adopted since that time, this is really because the daily needs of the inhabitants of those residences did not lend themselves to s symmetry. Men thought then rather of finding suitable internal arrangements and sufficient means of defense, rather than to present to passers balanced facades. Taste did not then consist in seeking this symmetry without reason, but on the contrary in expressing the various needs by the different appearances given to the buildings. The great hall, chapel, lodgings, kitchen, defenses and barracks, adopted the architectural character suitable for each part. Just as iu the city all the edifices were marked at the angle by their purpose, in a castle each service possessed a particular appearance. That did not conform to the taste of architects of the 17 th century, but it did agree with absolute taste, i.e., with truth and r reason. The ancients did not proceed otherwise, and the different parts composing a Roman villa had no symmetrical relation to each other.

The houses of private persons during the middle ages, whether occupying a great area or were small, allowed their internal arrangement to be clearly seen on the exterior. The hall, the room for the reunion of the family, was distinguished from the bedrooms and closets by the arrangement of its openings; stairways were visible and generally projected externally, a and if the stories were mezzanine, the architect did not cut great windows across the floors. The half timber facade was not concealed under stucco imitating stone, and the details were at the scale of the occupants. If the porticos protected passers, they were sufficiently low and deep to shelter them

while leaving as many wrinkles later their creases. Taking regarding the foundation as the point of view, it was believed that it was intended to supply water to all over whether it. Taking making the existence of a public quadrilateral a moral deductions, it was thought proper to wallet water a lack the weapons focusing at its view. The best of the architectural materials are then to give to effectively an appearance suited to its use, free to apply the ornamentation suited to such part. Irregularities in the lacuna itself, it should not be marred into a free marble ornamental monstrosity, without adhering its principles, placing its vestrons act the conjecture at the exterior of the house is a priority, before all practical and these needs as a domina.t matter.

To relate to architectural to taste, it has been mentioned, so, so much; we note in the walls that lack interest since varied as the character of the concrete, a corners arrived at the power of a transition difference; to have by the number the ita, and reject the faiss, to minimize exterior marks already in the old, and therefore regarded as over rustication; it data also to counter that facility in the use of the arches placed as are remarkable. A facility lack in the of the charts of the architecture of the monuments, like the architecture of the within area and of the Freemasonry. In arches of the arts one day said before us, while admiring greatly a cone drawn in terra cotta of Ponsardon:- "It is absurdity without the stiffness." So man roads, as many heresies in the matter of art. The Barre rules of Sculpture exists regarding the actions, and antique sculpture is not stiff. That is right, restricted and constrained, is averturing imitation, labored and mannered. He that knows, he that is true, makes what he does with grace, flexibility, consequently with taste. In summarizing the main rule of Ramuse needs to be merely a concerty the principles that have become familiar to us; it is by no good imitation of tiers, surprise principle. Use an ca, without knowing why we imitate them

Gommtrem. Gargoyle. See Art. Garoulle.

while leaving an easy passage under their arcades. Before regarding the fountain as the point of view, it was believed t that it was intended to supply water to all that needed it. B Before making the entrance of a public establishment a monumental decoration, it was thought proper to shelter under a hood the persons knocking at the gate. The task of the architect of taste was then to give to everything an appearance suited to its use, free to apply the ornamentation suited to each part. Architecture did not impose itself, it obeyed; but it obeyed like a free person without constraint, without abandoning its principles, placing its resources and its knowledge at the service of the needs to be satisfied, before all regarding these needs as a dominant matter.

To return to methods conformed to taste, we then have something to do, much to undo; we have to lay aside what less indulgent minds regard as the pedantry of the schools, a coterie arrived at the power of a tyrannical oligarchy; we have to re respect the true, and reject the false, to struggle against habits already grown old, and therefore regarded as even respectable, we have also to acquire that facility in the use of the means placed at our command, a facility that is one of th the charms of the architecture of the ancients, like the architecture of the middle ages and of the Renaissance. An amateur of the arts one day said before us, while admiring greatly s some group in terra cotta of Bouchardon:- "It is antiquity without the stiffness." So man roads, as many heresies in t the matter of art. The terra cottas of Bouchardon nowise resemble the antique, and antique sculpture is not stiff. What is rigid, restricted and constrained, is everything imitative, labored and mannered. He that knows, he that is true, makes what he does with grace, flexibility, consequently with taste. In architecture the sole mode of showing taste is to apply p properly the principles that have become familiar to us; it is not to seek imitation of forms, however beautiful they may be, without knowing why we imitate thema

GOUTTIERE. Gargoyle. See Art. Gargouille.

GRANGE. Barn.

A rural building suitable to contain forage and grain. The

[illegible] the 13 th century. To give the plan (1).

The entrance is placed at A in one of the long sides. That entrance consists of a vaulted tunnel with a stone door [illegible] it; at B is a well. Fig. 2 presents one of the double walls [illegible] day.[1] These bases were always placed on [illegible] and levelled with care, so as to remove rainwater from the base of the walls. In the vicinity of [illegible], or even sometimes in the ground, there were halls to receive the revenue of [illegible] and grain received by the [illegible].

Note 1.p.44. We owe these drawings, made with the greatest care, to M. Boulou, architect of the city of Paris.

The great abbeys took care to built their bases on altes surrounded by walls with turrets and well orchested gates. These bases of the storage of grain and forage were occupied by works temporarily detached in these [illegible] isolated

monks were greatly occupied in agricultural labors, especially after the 11 th century, and built a great number of barns, either within the enclosure of the abbeys or in the country. An Art. Architecture Monastique we gave some of these buildings surrounded by enclosing walls, just like our farm buildings today. These barns were in very great number and generally well built, for there still exist several of them in Ile-de-France, Normandy, Champagne and Touraine, that date from the 12 th, 13 th and 14 th centuries. Chiefly at the end of the 12 th century, when the abbeys had become very wealthy and d devoted themselves to the cultivation of their lands, were e erected the most beautiful and the largest. Usually they consisted of three aisles separated by two rows of piers or of posts supporting enormous carpentry. M M Verdier and Cattois, in their excellent work on Architecture domestique en moyen age, give several, among others the beautiful monumental barn of t the abbey of Maubuisson, that dates from the first half of the 13 th century. M. de Caumont, in his Bulletin monumental,[1] m mentions those of Perrieres, Ardennes and Eure; they date from the 12 th, 13 th and 14 th centuries. One of the barns of the abbey of Longchamps near Paris still entirely exists; it dates from the 13 th century. We give the plan (1).

Note 1.p.43. Vol. 14, p. 491; Vol. 15, p.193, 443, 493.

The entrance is placed at A in one of the long sides. That entrance consists of a wagon doorway with a house door beside it; at B is a well. Fig. 2 presents one of the gable walls s strengthened by five buttresses, and Fig. 3 is a cross section. The carpentry is executed with the greatest care in fine oak timbers with square corners. Fig. 4 gives one longitudinal b bay.[1] These barns were always placed on sheltered sites, dry and leveled with care, so as to remove rainwater from the base of the walls. In the vicinity of castles, or even sometimes in the court, barns were built to receive the stores of forage and grain required by the garrison.

Note 1.p.44. We owe these drawings, made with the greatest care, to M. Boutoud, architect of the city of Paris.

The great abbeys took care to built their barns on sites surrounded by walls with turrets and well protected gates. These centres of the storage of grain and forage were occupied by monks temporarily detached in these establishments isolated

in the midst of the fields, and because of some fault or to p perform penance. They were also inhabited by converts and by peasants. Thus they contained lodgings placed near the gates, and at night travelers could find lodging in these dependances, indicated by a light and the sound of a bell suspended over one of the entrances. Gradually the abbey barns with th- enclosures and lodgings came to group around themselves the habitations of the peasants, thus becoming the nucleus of a hamlet. We have in France many villages with no other origin, and that have retained the name of the grange. In time of war the peasants shut themselves within the enclosure, and defended themselves at their best. At the instigation of some noble rival of the abbey, they also came to pillage the barns of the monks or to set fire to them, which was no great benefit to t them.

Sometimes these rural buildings contained stables in the g ground story; such is the beautiful barn that yet exists near the church of S. Martin-aux-Bois in the department of Oise. The ground story is vaulted to receive the herds; above is a vast barn for forage. Barns are themselves fortified in certain localities, surrounded by ditches and flanked by towers. yet that arrangement rarely appears till the 15 th century, i i.e., at the time when the country in France was constantly ravaged by bands of wanderers.

GRIFFE. Claw. Corner-leaf.

This name is given to an appendage of the bases of columns during a certain part of the middle ages. One knows that the bases of the Roman Ionic and Corinthian orders consist of annular toruses resting on square plinths. (1). It results from this arrangement tha the toruses A leave four corners A uncovered with a horizontal upper surface, that the least movement of the column would break. We do not deny that the composition of this architectural detail is not perfectly classic, but a after this statement, we may be allowed to regard this arrangement as vicious from the point of view of construction, littl reassuring to the eye, that does not understand why these thin angles are retained under a vertical load. The ancients themselves felt so strongly the practical inconvenience of t the square plinth, that they cut away the bottom bed of these

projecting angles under the diagonals a b (2). That was an a admission of their uselessness; it would have been singular to have not retained them, giving the plinth a circular or polygonal form.

It must be believed that the Romanesque architects desired to avoid a fracture of the angles of the plinth, for from the 11th century we observe already, that from the last torus to the angle of the plinth was left an appendage or reinforcement, that gives a certain footing of a great resistance to these a angles. These first claws (3) are very simple in form; these are buds or spurs that spring from the torus and rest on the triangular surfaces of the four corners of the plinth (Art. Base). But soon these appendages being very near the eye, of them are made pieces of sculpture, very careful and often very rich. In the 12 th century, in Rhenish edifices are seen bases of cylindrical columns armed with large claws, finely sculptured, that strongly base the toruses on the plinth. Here (4) is one of those claws from the bases of the great piers of the choir of the cathedral of Strasburg. This ornament gives to the base a firmness very suitable for this architectural member, a strength absolutely wanting to the Roman base; the great lower torus is flattened (Art. Base), and further lends itself to receive these appendages.

Around the choir of the abbey church of Vezelay, the great cylindrical piers rest on bases ornamented by very beautiful corner leaves (15). We find some of them very remarkable, likewise sculptured, on the angles of the plinths of the great columns of the sanctuary of the collegiate church of Poissy; some (for these corner leaves vary on each base) representing fanciful animals sculptured with much delicacy (6). These two examples belong to the end of the 12 centurw. At the beginning of the 13 th century, the leaves are less varied in form; but their sculpture is energetic, very appropriate for the place and broadly modeled. Here (7) is one of the leaves from the b bases around the choir of the cathedral of Laon. That leaf is terminated by a crocket scrolled on itself at its end and is intimately connected to the torus; it seems to have started on its surface and to overlay it. One understands that these strong appendages give strength to the corners of the plinth, and permit them to resist the pressure caused by the irregular settlement.

Sometimes (at the beginning of the 13 th century) the leaf is only a recess cut at the angle of a very thick plinth. Examples of this sort of plinth are seen on the engaged columns of the chapels around the choir of the cathedral of Troyes. (8). The most ordinary leaf adopted in that epoch takes the form of a water leaf strongly resembling the heart leaf of a antique architecture, but more strongly modeled. Thus are sculptured the leaves of the bases of the columns of the lower part of the cathedral of Paris (9). About the middle of the 13 th century, the plinths of the bases being almost always c cut octagonal, the leaf disappeared. One sees it reappear in some monuments of the 14 th century, as at the (old) cathedral of Carcassonne (10) and at the cathedral of Sens (11).[1] It de definitely vanished in the 15 th century. One can regret that this beautiful ornament was entirely abandoned; and indeed that if by chance an architect should use it anew as a necessary appendage to reassure the eye, men would not fail to accuse that architect of causing us to return to the barbarous times. But one should not despair of seeing it resume the place, that it so legitimately occupied.

Note 1.p.52. Left pier at the entrance of the nave, restored in the 14 th century.

GRILLAGE. Grille. Iron Grating. Screen.

A network of small iron bars or wire designed to protect g glass from hail, to preserve sculptures from contact, also sometimes precious articles deposited in the treasuries of c churches or castles. There remain few examples of grilles from an early epoch, yet we still possess some dating from the 13 th century. The windows of the chevet of the old cathedral of Beziers retain their gratings, that are pretty pieces of forging. They consist (1) of alternately simple muntins and of muntins to which are welded delicate iron sprays. These gratings are fixed in the jambs of the openings by means of cross bars A; these are provided with swelled openings, as indicated in detail B. The cross-bars are 0.8 in. thick by 1.4 ins. wide; the muntins are 0.6 in thick jy 0.8 in. wide; the sprays average 0.4 in square, and are held by means of clamps C set cold. But these are rather very delicate grilles than gratings.

Here (2) is an example of gratings made of iron wire and t

CATTLE. Grills. Iron Enclosures.

In some monasteries of ancient date or fabrics. Even mediaeval artificers employed cast bronze for the grilles and enclosures. After the wizards of the artistic, in the first stage of the middle ages, this originate the beautiful minted. Strip may know the beautiful grilles in cast copper of Notre Dame of Lys-la-Chapelle, and which date from the 9th cycle of Charlemagne. These monasteries were especially made without in the last of by Benedictine artisans established in Germany. The beautiful work there mentioned were very rare, but from the most of the monastery employed and by the work of modelling and molding, they could be easily produced. Product here was in very common use in that from a very early period, but was in particular adopted for all that relationship which is French Latin was a mixed work. The art of the world the play (employed) among the and it was singularly perfected during the 11 th and 12 th centuries. It is necessary to know that this and the Bronze the methods of manufacture introduced by modern industry; wrought iron was variously in plates or bars in the form of bands by hand, without the aid of those powerful engines, that can instantaneously reduce a block of red hot iron into wire. To obtain a long iron bar of uniform size, well annealed and smooth, was a first difficulty of which we have no idea, since all our iron is delivered to us by the mills, rolled into bars of all dimensions and of very varied sections, without the hand of the smith having ever participated in this operation. Although the concept that the Italian artistic of mechanical fabrication, yet it is certain that artists have gradually lost the skill of working iron and of forging its structures. Twenty years ago, the smith was mainly employed in Paris a very decrease of fabricating the standard grilles, and if we find them today, this is due to the reasonons in the [illegible] of the grilles made and in some of those arts-

that date from the 14 th century. This fragment was found at Rouen with a dealer in ironwork, and we have seen one absolutely similar in the cathedral of Munich. It will be admitted that those old iron workers or makers of gratings had more i imagination than those of our times. Our modern gratings have a less pleasing appearance.

GRILLE. Grille. Iron Enclosure.

An open enclosure of wrought iron or bronze. Roman antiquity often employed cast bronze for the grilles and enclosures. After the example of the ancients, in the first times of the middle ages, this procedure was sometimes adopted. Every one knows the beautiful grilles in cast copper of Notre Dame of Aix-la-Chapelle, and which date from the epoch of Charlemagne.[1] Those enclosures were apparently made either in the East or by Byzantine artists established in Lombardy. But besides that those enclosures were very dear, both from the cost of the m materials employed and by the cost of modeling and moulding, they could be easily broken. Wrought iron was in very common use in Gaul from a very early period, and was by preference adopted for all open enclosures made in France during the m middle ages. The art of the smith was also developed among us, and it was singularly perfected during the 11 th and 12 th centuries. It is necessary to know that then men did not have the methods of manufacture introduced by modern industry; wrought iron was extended in plates or drawn in the form of bars by hand, without the aid of those powerful cylinders, that now instantaneously reduce a block of red hot iron into iron wire. To obtain a long iron bar of uniform size, well squared and smooth, was a first difficulty of which we have no idea, since all our iron is delivered to us by the mills, rolled i into bars of all dimensions and of very varied sections, without the hand of the smith having ever participated in this p primary work. Although one cannot deny the immense advantages of mechanical fabrication, yet it is certain that smiths have gradually lost the habit id working iron and of knowing its properties. Twenty years ago, one would have vainly sought in Paris a smith capable of fashioning the simplest grille, and if we find them today, this is due to the researches in the industrial arts of the middle ages and to some of those arch-

Note 1.p.55. See Guilhabaud, Architecture du Ve au XVIIe siecle.

architects, who as some say, tend to nothing else than to cause the art of architecture to recede toward barbarism. That being said in order to render to each his due, let us occupy ourselves with grilles. It will be understood without difficulty, that when it is necessary to draw out by hand a piece of red hot iron in the form of a bar, men would avoid as much as possible making these bars of great length. The smith is compelled to turn that piece on the anvil and to bring it gradually to the dimensions of a square rod, he cannot exceed certain small dimensions, and he must seek by combinations of t the connections to avoid very long bars, consequently very h heavy. That alone explains why the oldest grilles are composed as far as possible of small bars.

Note 1.p.55. See Gotlhebond, Architecture du Ve ou XVIIe siecle.

One of the oldest grilles known to us, and that is a work of art, is found in the cathedral of Puy-en-Velay. That hinged grille in one leaf consists of a frame of iron 1.6 ins. by 0.8 in. thick, containing four cross-bars separated by muntins 0.6 by 0.8 ins., between which are arranged iron scrolls very artistically composed. That grille dates, we think, from the beginning of the 12 th century. Here is a fragment of it (1). In height are counted 5 panels of scrolls welded at the connections and held to the muntins by clasps B. These clips are not welded but simply bent hot. Iron forged by hand always p presents irregularities, and the smith to conceal these irregularities had the idea of covering the muntins, scrolls and their clips by strokes of the punch and chisel, which gives this ironwork a bright appearance, costly and refined. The detail (2) indicates this kind op work done cold. Even the i irregularity if the work givas a special charm to those pieces of work on which the hand of man is felt everywhere. The muntins of this grille are set flat and as we have stated, a are 0.6 j 0.8 in. The scrolls average 0.3 j 0.6 in.

Dureng the course of the 12 th century the mode of making the grilles was modified little; there are always muntins held in the sash and enclosing ornaments formed of iron spirals or square or flat section. When it is desired to give much strength to the grilles, the muntins and the spiracs present t the edges (3); on the contrany when a light appearance is to be given to them, the muntins and scrolls present their wide

sides (4). This may appear singular, for the geometrical drawing produces precisely the contrary effect; but the architects of the middle ages did not occupy themselves with the purely conventional geometrical effect. It is clear that every grille seen obliquely on the widest part of its surface, if the iron be set edgewise, their broad sides appear and are developed, which gives a striking appearance to the work; on the contrary, if they are set flat, their wide sides diminish by the effect of perspective, and narrow surfaces do not encroach on the vo voids. Fig. 5 gives the same drawing of a grille, that at A b being made with bars set edgewise, the other at B having bars set flat, which will make understood this simple law, generally so little observed, because of the habit that we have acquired of paying no attention to the perspective effect in execution. But a geometrical elevation of a grille A will seem light and the grille B will appear strong, while the contrary occurs in execution.

However about the end of the 12 th century, the smiths sometimes sought combinations other than those produced by scrolls and sprays comprised between the muntins and cross-bars, they connected together with much skill panels of ornaments forming large designs by their combination. But that was rarely employed except for light enclosures composed of very thin bars. M. Didron possesses a very pretty grill of this kind, that has b been engraved in the Annales archaeologiques,[1] and that certainly belongs to the very remarkable ironwork of the end of the 12 th century and beginning of the 13 th. Those grilles are composed of scrolled sprays, only ornamented by some strokes of points or chisels, and seemed too poor to the smiths of the 12 th century, when it was necessary to enclose sanctuaties, to close certain important parts of religious or civil edifices; they soon terminated these scrolls by ornaments stamped hot in the die or matrix of hardened steel. Thus were fabricated the beautiful grilles, some remains of which are still seen in the abbey church of S. Denis, and of which we give a specimen here (6). These grilles date from the end of the 12 th century, are forged with rare perfection, and it s seems that in the hands of the workman the iron acquired the malleability of lead. The ornaments are stamped on only one side. Our Fig. is one-fourth full size, at A we have traced

the section of the spiral at half size. Abbot Suger caused to be made for his church grilles of cast copper, as stated by contemporary authors and by Dom. Doublet, who saw them; they were destroyed at the beginning of the last (18 th) century. One observes that the system of iron grilles composed of panels of ornaments comprsed between the muntins and cross-bars, at the same time offered much stability and lightness; these panels could be easily inserted, removed or repaired, be rich or simple, very leaborate or thin. It occurred that these panels were sometimes grooved into the muntins finished with iron strips exceeding their breadth, thus forming a series of grooves. Many sanctuaries of churches were enclosed by grilles so combined; we still find quite beautiful examples in the choir of the abbey church of S. Germer,[2] and on all sides are remains that show us well, that their use was very frequent, that this sort of works was not at all rare, and that the smiths made them without difficulty. Cupboards containing precious articles, tombs and shrines, were surrounded sometimes by grilles of extreme richness, particularly at the epoch when the art of the smith supplied the most beautiful examples of ironwork, we mean the 13 th century.(Art. Serrurerrie). T Those sorts of grilles are only decorated on the external face, and the scrolls, instead of being placed between muntins and cross-bars, are often placed before the principal framework. For example, such is the beautiful iron grille that protects the tomb of queen Eleanor in the choir of the abbey church of Westminster. We likewise possess in the storerooms of the imperial church of S. Denis, fragments of wrought grilles assembled according to this method (6 bis), that has the advantage of singularly stiffening the simple framework composed of muntins and cross-bars. These scrolls,finely forged, stamped and retouched with the chisel, riveted on the iron framework,gives it great richness at the same time as the stability against e every test.

Note 1.p.59. Vol. X. p.117.

Note 2.p.59. See Encyclopedie d'Architecture. Bonce, editor.

Grilles for protection of treasuries, sanctuaries, rich tombs, preceius reliquaries, not only present an obstacle to t thieves or to indiscreet persons, but they are also sometimes armed with points and spikes that make climbing dangerous; s

such is the grille of the sanctuary of the church of Corcone, of which we give a fragment (6 ser). This grille is 4.6 ft. high, including the decorated posts, and presents essentially the usual a prolongated lozenges, that takes away all idea of crossing to which in latter ages medieval characters are fastened with posts, lapped and forged with care. The ornamentation is and as justly treated' small, that zeal to be exactness of the workmanship. This medieval grille is identical and in design in elevation in Vol. XI of Annales archeologiques of M Didron; i appears to me to belong to the end of the 12 th or the beginning of the 13 th centuries.

Before presenting models of medieval grilles of a more recent epoch, it is necessary to say some words concerning fixed grilles and gratings fastened in glazed windows, serving both as grilles and for defense. The masters of versailles of provence, of French abbeys, of monastic in castles, were often equipped with this sort of grilles artistically wrought. We shall now go to see or observe at the Trocadero museum models of the charm of fixed grilles of the 17 th century, representing in study. These fortifications in wrought iron, and yet form grilles a very good effect. These Gothic-Renaissance models are only 0.4 m. wide with a height of 1.0 m. The inferior mouldings of a diamond bar of 0.04 m. 1.0 cm. square, arrow-bars i square like keys thrown enlargements in the vertical bar. These cross-bars are flat, 0.8 × 0.3 in. Scrolls of flat iron 1.2 by 1.2 inc. are crossed and well interwoven by means of cross of arrows 1. The vertical bars is thickened at its upper end in order the pile rests in the brackets of the arrow, and is rate hovered at its lower end to furnish a good anchor. Here are no nails, only small forged pieces assembled in the most natural way. We have also seen these sorts of defensive grilles placed before windows of the 13 th century, and which are composed of vertical flat bars 1.4 × 0.2 inc., with keys riveted and crossed as indicated by Fig. 8.[1] The rivet is square in order to prevent the keys from turning. It is necessary to mention here also a very beautiful first grille for defense found at Lyre, Nor. D. Lyrions. It has this an entire round arm 0.2 ft. diameter, and is built of each bars flight a free circle. Its shaft arrested as resembles those the medieval, and are held by two stanchions and never rivetting bars.

such is the grille of the sanctuary of the church of Conques, of which we give a fragment (6 ter). This grille is 4.6 ft. high including the crowning points, and presents externally on each muntin a projecting appendage, that takes away all idea of attempting to scale it; further the muntins themselves are furnished with points, barbed and forged with care. The appendages A end in little dragons' heads, that seem to be guardians of the sanctuary. This curious grille is described and dr drawn in elevation in Vol. XI of Annales archaeoligiques of M Didron; i appears to us to belong to the end of the 12 th or the beginning of the 13 th centuries.

Before presenting models of enclosing grilles of a more recent epoch, it is necessary to say some words concerning fixed grilles and gratings fastened in glazed windows, serving both as grilles and for defense. The windows of treasuries of churches, of ground stories, of openings in castles, were often equipped with this sort of grilles artistically wrought. We still see on the exterior of the Romanesque openings of the church of Brede grilles of the 12 th century, interesting to study. Their fabrication is very naive, and yet they produce a very good effect. These Romanesque windows are only 10.2 ins. wide with a height of 3.0 ft. The defense consists of a single vertical bar of iron 1.2 ins. square, cross-bars A passed like keys through enlargements in the vertical bar. These cross-bars are flat, 0.8 × 0.3 in. Scrolls of flat iron 1.2 by 0.2 ins. are crossed and held consequently by means of cross keys A. The vertical stem is diminished at its upper end to enter the hole made in the keystone of the arch, and is made dovetailed at its lower end to furnish a good anchor. Here are no welds, only small forged pieces assembled in the most natural way. We have also seen these sorts of defensive grilles placed before windows of the 13 th century, and which are composed of vertical flat bars 1.4 × 0.8 ins., with keys riveted and crossed as indicated by Fig. 8.[1] The rivet is square in order to prevent the keys from turning. It is necessary to mention here also a very beautiful fixed grille for defense found at Agen, Rue S. Antoine.[2] It now fills an entire round arch 5.2 ft. diameter, and we think it must have filled a rose window. Six panels arranged as voussoirs compose the semicircle, and are held by two semicircles and seven radiating bars.(9).

We give at A the detail of the principal piece of one of these panels formed of scrolls of iron 0.32 in. square welded by means of bands B, according to the method employed by the smiths of the 13 th and 14 th centuries.

Note 1.p.63. Houseaot S. Antonin.

Note 2.p.65. By M Aloux, architect. This grille, or rather fragment of grille, is placed now under an arch of the door of a house, whose erection dates in a quite recent epoch. The c centre of the grille exists no longer, and we assume it to be restored. (Art. Serrurierie).

Let us now return to enclosing grilles with opening parts. Fig. 6 furnishes us with one of the first examples of this s sort of grille with stamped ornaments; but there the bars are stamped and decorated on the flat; the work was much more difficult if necessary to ornament scrolls set edgewise. Yet that was frequently done by the smiths of the 13 th century. T There is still seen in the church of Braine near Soissons portions of fixed grilles of charming design forged by that method. Very light in appearance and with iron set edgewise, these grilles have great stability. At A is traced the section of the scrolls at full size. These scrolls are stamped on both edges at B and C, which adds much to the difficulty of execution. The thickness of the edge diminishes much at the end of each branch bearing an ornament, so that these ornaments are kept within the thickness E F.

Meanwhile the art of the smith has not remained stationary in France; it sought new means and forms, that had not yet been employed. From the beginning of the 14 th century, the system of grilles composed of scrolls twisted and stamped, assembled by means of clamps and not welded, like the grilles of S. Denis, S. Germer, S. Aventin,[1] of Braine, and of the cathedral of Rheims, were but rarely used; men sought other combinations, introduced plates of wrought iron perforated and in relief, as decorative means, instead of ornaments stamped on solid iron. The smiths desired to produce more effect with simpler means of fabrication. The industry was perfected, but the art lost. Rivets replaced clamps, and even welds; it must no less be recognized, that the workmen of that epoch w were much more skilful than ours, concerning the mode of handling the iron and submitting it to the action of fire. Indeed,

for one that will take the trouble to study the procedures employed by the smiths, what must surprise him in the fabrication of those delicate works, is the uniformity in execution and the malleability of the metal. The iron bars of these old grilles, although placed in the fire a great number of times before the completion of the work, are never burnt, they retain their flexibility, and the welds are made with a perfection and freedom very difficult to obtain today.[1] The file is used to correct the errors of the smith; there a file was never employed on visible parts, but the hammer alone leaves its mark on the iron.

Note 1.p.65. See Guilhabaud, Architecture du Ve au XVIIIe siecle et les arts qui en dependent. Vol. IV.

Note 1.p.68. We do not wish to seem unjust toward our time; with a little persistence and good advice, one again today co comes to make these works in iron. Besides, it is never workmen that are wanting in France. The obstacle is routine and prejudices; to speak out, it is the ignorance of the chiefs, an ignorance passed into the state of privilege that cannot be attacked.

Here is a fragment of the enclosing grille of the 14 th century (11), which explains the transition between the system of grilles with stamped ornaments and those obtained with iron p plates in relief attached by rivets. Here are not the attached plates, but there is no longer the stamped iron; the principle of muntins and cross-bars remains, and each scroll is made and introduced in detail A; the cut leaves are obtained at the expense of the scrolls, whose rod has been upset to form a mass and then flattened under the hammer. Instead of b being attached to the muntins by clamps, like the grilles of the 13 th century, these scrolls are riveted laterally at C. The muntins pass through the eyes of the upper cross-bar and are riveted under the lower cross-bar at D; further, they are covered on two faces by two thin bands of wrought iron retouched and incised with the chisel. These strips, that we have o omitted in the drawing of the entire grille, are represented in the detail E; the muntins and cross-bars are 0.6 in. wide by 1.0 in. deep; the scrolls are 0.2 by 0.6 in. deep. The entire grille between cross-bars is nearly 3.3 ft. high.[1]

Note 1.p.69. From a cloister, storerooms of S. Denis.

Jacobally at the end of the 14 th and beginning of the 15 th centuries, the iron plates serving as armamets are welded to the large bars of the aerolis: it was only later that the riveted plate was evolved as a decoration. There exists in the cloister of the cathedral of Fu-en-Velay a prille of just that, very artifically formed. To date it as a weapon. Each bay bears an oese arch welded to the cross-bars A.(See c f the section on c, D). The back of the arch is riveted at F to the middle mastin of the bay, which is twisted; the other mastins have a cross section 0.6 in. square. The trefoils C are flattened on the anvil at the extreme ends and open. The leaves D and the plate are welded to the arch. Between the m mastins little iron plates are cut and grooved to form the arcade E (see detail G). The crowning leaves are also of plates and are carefully welded to the points of the bars. The bars and capitals of the mastins and the modiatures of the buttress as are shaped with the hammer, without traces of the file. T then (about the beginning of the 1, th century) men frequently put two moulds or cross-bars (partially, as indicated in the opposite drawing (12). That sometimes allowed the filling or pasonts to be held without having recourse to rivets or clamps. Here is a remarkable example that comes from the cathedral of Coutances (13). One sees how the diagonals bar A is held by the two notches that fit the two cross-bars B set diagonally. In this example the flat bars of the aerolis are riveted at C on the diagonal bars and are coulded into out plates at the ends (section G, where pieces are shown). As indicated by the different arrows B.

In the minister of the last mentioned is a prille formis of the 15 th century without armamets of hammered or stamped iron, but whose simple composition and mode of fabrication were exciting (14). It forms lightness fitting A, mastins cross-bars B, through which pass the mastins C set diagonally. Many mastins are alternately welded in their mouth work, as indicated by detail D, to receive the aerolis E and their reverse. The edge mastins (lower-inner) are merely hammered twist through the aerolis at C.

The later arrangement provided a similar manufacture. The aerolis rests upon beside the buttresses as indicated by detail D. On the other hand these aerolis rest against the bars parts

Generally at the end of the 14 th and beginning of the 15 th centuries, the iron plates serving as ornaments are welded to the large bars or the scrolls; it was only later that the riveted plate was employed as a decoration. There exists in the cloister of the cathedral of Puy-en-Velay a grille of that kind, very skilfully forged. We give it as a whole.(12). Each bay bears an ogee arch welded to the buttresses A.(See at K the section on a b). The apex of the arch is riveted at B to the middle muntin of the bay, which is twisted. the other muntins have a cross section 0.6 in. square. The trefoils C are flattened on the anvil at the extreme ends and cusps. The leaves D and the plate are welded to the arch. Between the m muntins little iron plates are cut and groowed to form the arcade E (see detail G). The crowning leaves are also of plates and are carefully welded to the points of the bars. The bases and capitals of the muntins and the mouldings of the buttresses are shaped with the hammer, without traces of the file. T Then (about the beginning of the 1, th century) men frequenlty set the muntins or cross-bars diagonally, as indicated in the opposite drawing (13). That sometimes allowed the filling ornaments to be held without having recourse to rivets or clamps. Here is a remarkable example that comes from the cathedral of Constance (13). One sees how the diagonla bar A is held by the two notches that fit the two cross-bars B set diagonally. In this example the flat bars of the scrolls are riveted at C to the diagonal bars and are chauged into cut plates at their junction D, these plates all being varied, as indicated by the different sketches H.

In the cloister of the last cathedral is seen a pretty grille of the 15 th century without ornaments of hammered or stamped iron, but whose simple composition and mode of fabrication merit mention (14). At certain distances buttresses A receive cross-bars B, through which pass the muntins C set diagonally. Those muntins are alternately reduced in their upper part, as indicated by detail D, ho receive the scrolls E and their rivets. The other muntins F have tenons, that enter the upper rail through the scrolls at G.

The lower ornamentation presents a similar construction. The scrolls return beside the buttresses as indicated by detail O. On the other hand these scrolls rest against the thin parts

of the points P, to which they are attached by rivets. The muntins F′ pass through these scrolls at R and extend into the h horizontal bar S. One understands that this system of ironwork is very stable; the scrolls ahe not only attached by rivets, but depend on the principal structure, since the muntins or cross-bars stop them in a sure way by tenons. The muntins are 0.6 in square, the buttresses are 1.2 by 1.0 ins., the cross-bars are 1.2 × 0.8 ins.

The last examples of grilles that we have just given indicate mostly crownings more or less rich. Indeed the grilles of the middle ages always possessed these, unless they were arranged to serve as railings. After the 15 th century, these c crownings sometimes assume great importance, and are merely the decorated prolongations of the muntins passing through t the upper cross-bar. In the bays of the enclosure of the choir in the cathedral of Toulouse are noted fixed grilles, also very simple and fabricated in the 15 th century, whose crownings fill the trefoils of the stone arcade. Here (15) is one of them. The fixed grilles in the windows of castles or of houses are nearly always terminated by crownings, that one can only regard as an expansion of the muntins. We cite here the grilles of the windows of the caslte of Tarascon (15 th century). These grilles are composed of muntins close together and passing through the swelled eyes of the cross-bars, and forming perfect squares with these. The two extreme and central muntins are terminated (16) by cross flowers of welded plates, while the lower ends of the same muntins are drawn out into very sharp points. Each muntin is fixed in the stone by a square bend, as indicated by the profile A. It is the same for the cross-bars. Often the fixed grilles of windows are terminated at top and bottom by very elaborate points presenting formidable defenses; this sort of spiny grilles, a specimen of which we present (17), was placed before the windows of castles, particularly to prevent attempts at treason, the introduction of enemies into a war structure by means of ladders, by openings on the exterior. These gratings deeply anchored with lead at each cross-bar A and even sometimes at each muntin, could be torn away only after long labor. Precautionary measures were ever carried so far, that in certain cases the muntins and c cross-bars were so assembled, that it became impossible, ei-

ranges to guide the martins in the eyes of the cross-bars, or the cross-bars in the eyes of the martins, these eyes being made alternately in the cross-bars and martins (12). It was necessary to be a good skilful smith to make good spillins, for each eye must be forged as the cross-bars and martins were assembled, i.e., the drills must be forged while all hot, which was a considerable labor. Then the artisan took pains to fire each mean of the drills a certain number of times. For these was needed to play with difficulties of workmanship, that appear inconceivable to us today. The examples here given were first made in Kostroma. Drills of this kind are found, i.e., with alternated eyes, at Tver, Tarusa, and in many places in the North and East. They date from the 14 th, 15 th and 16 th centuries. This (Fig. 12) is of the beginning of the 16 th century. However the skill of the smiths is not equal in all the provinces that compose the France of our days.

Iron was wrought much better north of the Loire and in the provinces adjoining the Seine than in the West and South. Ordinary drills belonging to smiths of the 14 th or 15 th centuries, for example, although well manufactured, cannot be compared to the works in iron of Tie-in-Provence, Pierrefy or Flandre.

There is still seen in S. Germin of Toulouse a drills (13), that enclosses the shape at the right of the cross of the tenons: although that work in iron may be very well executed in composition, the recommendable is of the cassest. The martins of square bars are heavily wrought, and terminate in finials E of hammered and tolled iron. Heads of plates A and C are fashioned and perforated, much the cross-bars of the drills and their swelled eyes as indicated by section D. The plates of the cross-bar C, located at F, terminate in little cockleshells with rosettes, whose form is explained by the perspective figure X. The plates of the cross-bars a b, A B, are made in private workshops and rather by workmen than smiths. They are then entirely independent of the drills and serve only for the decoration of the work. These drills date from the end of the 15 th century, and are the first where plates encased by rivets replace the plates of iron hammered and welded. That simplifies the fabrication and certifies the tendency of the ironwork in very rich fashion, but must diminish

either to slide the muntins in the eyes of the cross-bars, or the cross-bars in the eyes of the muntins, these eyes being made alternately in the cross-bars and muntins (18). It was necessary to be a very skilful smith to make such grilles, for each eye must be forged as the cross-bars and muntins were assembled, i.e., the grille must be forged while all hot, which must cause considerable labor. Thus the workman must place in the fire each mesh of the grille a certain number of times. But these men seemed to play with difficulties of workmanship, that appear insurmountable to us today. The example here given came from a house in Constance. Grilles of this kind are found, i.e., with alternating eyes, at Troyes, Strasburg, and in many places in the North and East. They date from the 14 th, 15 th and 16 th centuries. This (Fig. 18) is of the beginning of t the 16 th century. However the skill of the smiths is not equal in all the provinces that compose the France of our days.

Iron was wrought much better north of the Loire and in the provinces adjoining the Rhine than in the West and South. Certain grilles belonging to edifices of the 15 th century on the banks of the Garonne, for example, although well designed, cannot be compared to the works in iron of Ile-de-France, Picardy or Flanders.

There is still seen in S. Sernin of Toulouse a grille (19), that encloses the choir at the right of the piers of the transept; although that work in iron may be very well understood in composition, the workmanship is of the coarsest. The muntins of square bars are heavily wrought, and terminate in finials E of hammered and welded iron. Bands of plates A and B are fashioned and perforated, mask the cross-barsof the grille and their swelled eyes as indicated by section D. The plates of the cross-bar b, detailed at B, terminate in little battlements with rosettes, whose form is explained by the perspective figure C. The plates of the cross-bars a b, A B, are held by rivets passing above and below the horizontal bars: they are then entirely independent of the grilles and serve only for the decoration of the work. These grilles date from the end of the 15 th century, and are the first where plates attached by rivets replace the plates of iron hammered and w welded. That simplifices the fabrication and permits the decoration of the ironwork in very rich fashion, but must slightly

[illegible] the school of smiths, so brilliant during a part of this school was not near extinction in the provinces of the northeast, as we have just seen, and the ironwork of the 15 th and 16 th centuries, as forged work on the banks of the Saône, in Bisnere, Switzerland and Savoie, is perfect in a succession. We do not know who was the person that modeled the grilles of the tomb of Varinlien at Tredbrock; but as a work in iron, these grilles are superior to all that we know of this kind. (Fig. Ferrarrerie). At the end of the 15 th and the beginning of the 16 th centuries, one finds very frequently in the provinces of the East grilles, whose panels are made as indicated in Fig. 20. The entire compartment is formed of a circle round not 0.5 in. diameter, made on itself and cons-tituting itself, as shown in sketch A. In Art. Ferrarrerie we describe the processes of fabricating this sort of grilles, which with great difficulty and after having cost many iron rods, we have caused to be reproduced by very skilful smiths. Yet this kind of grilles composed of iron rods penetrating in all directions are sufficiently common, that one must admit that they were made without difficulty in the 15 th and 16 th centuries. Although light, they offer perfect stability; for most taken grilles work only in spite of the natural weight, that one is obliged to give them, are those taking an oval, that make of ironwork a fabrication to be compared to lace-work. To assemble iron bars by means of hinges and screws with nuts would have seemed an enormity to the smiths of the middle ages and Renaissance; this means, proper in joinery, does not at all accord with the nature of iron, and the dimensions that one must give to the parts of a grille. In fact, we no longer know how to weld iron but assemble it; this is no longer iron-work; and still we believe that we know how to employ the me-tals suitable for architecture much better than did the artists, who proceeded as by several centuries. It is clear that fabric-ation on a great scale, most of the mills, has developed in our time in a reasonable manner; but it is also certain that workmanship has fallen from which it was some centuries since, when in concerns the working of iron. However very bea-utiful grilles were still made in France during the 15 th, 17 th and 18 th centuries; but measures and proceed always clay

depress the school of smiths, so brilliant during a part of the 12 th and the entire course of the 13 th century. Yet this school was not near extinction in the provinces of the northeast, as we have just stated, and the ironwork of the 15 th and 16 th centuries, as forged work on the banks of the Rhine, in Flanders, Switzerland and Bavaria, is perfect in e execution. We do not know who was the smith that wrought the grilles of the tomb of Maximilian at Innsbruck; but as a work in iron, those grilles are superior to all that we know of t the kind. (Art. Serrurierie). At the end of the 15 th and the beginning of the 16 th centuries, one finds very frequently in the provinces of the East grilles, whose panels are made as indicated in Fig. 20. The entire compartment is formed of a single round rod 0.5 in. diameter, bent on itself and penetrating itself, as shown in sketch A. In Art. Serrurerie we describe the procedure of fabricating this sort of grilles, which with great difficulty and after having burnt many iron rods, we have caused to be reproduced by very skilful smiths. Yet this kind of grilles composed of iron rods penetrating in all directions are sufficiently common, that one must admit that they were made without difficulty in the 15 th and 16 th centuries. Although light, they offer perfect stability; for what makes grilles weak today in spite of the unusual weight, that one is obliged to give them, are those tenons and pins, that make of ironwork a fabrication to be compared to joinery. To assemble iron bars by means of tenons and mortises with pins would have seemed an enormity to the smiths of the middle ages and Renaissance; this means, proper in joinery, does not at all accord with the nature of iron, and the dimensions that one must give to the parts of a grille. In fact, we no longer know how to weld iron but assemble it; this is no longer ironwork; and still we believe that we know how to employ the metals suitable for structures much better that did the smiths, who preceded us by several centuries. It is clear that fabrication on a grand scale, that of the mills, has developed in our time in a remarkable manner; but it is also certain that workmanship has fallen much below what it was some centuries since, when it concerns the working of iron. However very beautiful grilles were still made in France during the 16 th, 17 th and 18 th centuries; but hammered and riveted plates play

the chief parts in the decoration of those works; men have l lost the methods of welding so skilfully practised by the guilds of smiths of former times.

GRISAILLE. (Art. Verriere).

GUETTE. Watchman. Sentinel.

The person charged to watch at the tops of the defenses of castles.

"We have no watchman, do you know who watches?" [1]

Note 1. p.79. Coutier d'Aupois. Tole of the 13 th century published by Fr. Michel. 1835.

The watchman was not only charged to warn the persons of t the castle of all that passed in the country, but also to play airs at certain hours of the day:- (old French poem).[1] Sometimes the name of watch is given to the place where the sentinel stands. (Art. Echauguette).

Note 1.p.80. Coutier d'Aupois. Tole of the 13 th centurw.

GUICHET. Wicket.

A little perforated leaf in the great leaf of a door, that can be opened separately. (Art. Porte).

GYPSERIE. Stucco Work.

A light work in plaster. Plaster was much employed during t the middle ages, particularly to coat interiors. We have also seen in the archbishop's palace of Narbonne a small rose window, whose compartments separate two adjacent halls. The work dated from the 16 th century. A goodnumber of mantles of fireplaces in houses were made of plaster (Art. Cheminee). Thus were made in plaster partitions, open enclosures in the interiors of palaces and ceiling ornaments. (Art. Plancher).

HALLE. Market.

An enclosed area, covered or uncovered, in which merchants by means of a rental paid to the lord of the said place, acquired the right of selling certa n kinds of merchandize. From the 10 and 11 th centuries there was at Paris a market that w was held on a site surrounded by a ditch designated by the n name nf Campelli or Champeaux (meadows) nearly on the site of

the market of the Tuscanies. "At the beginning of the 12 th century," says Sauvel,[2] "Paris has not established there a new market for the merchers and moneychangers. Paris remained in 1231 transferred there to the fair of S. Lazare. Two years I later be caused to be built two markets enclosed by a wall fortressed with arcos and enclosed by good gates, so that when it rained the merchants could sell their merchandise, and remain covered at all times and in all security." Markets multiplied gradually in Paris during the course of the 13 th and 14 th centuries; S. Louis caused several to be established a about 1262. Generally the market in the middle ages was nothing but an area belonging to a feudal lord or to the city, on which was perfected the sale of merchandise. The market was held in a place, under the courses of churches or cloisters, around well-towers, city walls, under arcos. Indeed the market had no commercial character peculiar to it. There is then no reason to believe on those occasionnaches. Let Sauvel[1], "consisted of 20 bays, was 22.4 ft. wide, and was covered by a vault of out arcos." But that market having been d [illegible] in 1571, [illegible]

note 2.p.80. Sauvel. Book IV.

Pavage. Porcullis.

A heavy open frame covered of iron bars or of framed carpentry, sliding in two vertical grooves and forming an obstacle under the opening of a fortified gateway. The porcullis is raised by means of a counterpoise or a windlass; it falls by its own weight. The Romans knew the porcullis; it is seen represented on viaducts of aqueducts of the 9 th and 11 th centuries. Yet in military entries still examples, we know more earlier than the 12 th century.

By small bars inserting in grooves in vertical [illegible] tions of porcullises in Act. Force.

[illegible]. Tabard.

A manner for working gates. The first knockers seem to have been little mallets suspended on the leaves of portals. (Old Roman poem).[1]

[illegible]

the market of the Innocents. "At the beginning of the 12 th century," says Sauval,[2] "Louis the Fat established there a new market for the mercers and moneychangers. Philip August in 1181 transferred these to the fair of S. Lazare. Two years later he caused to be built two markets enclosed by a wall furnished with shops and enclosed by good gates, so that when it rained the merchants could sell their merchandize, and remain covered at all times and in all security." Markets multiplied singularly in Paris during the course of the 13 th and 14 th centuries; S. Louis caused several to be established about 1263. Generally the markets during the middle ages were nothing but an area belonging to a feudal lord or to the city, on which was permitted the sale of merchandize. The market was held in a place, under the porches of churches or porticos of houses, around bell-towers, city halls, under sheds. Indeed the market had no monumental character peculiar to it. There is then no reason to eularge on those establishments. Yet Sauval mentions the wholesale cloth market of Paris, that from 1417, "consisted of 20 bays, was 38.4 ft. wide, and was covered by a vault of cut stone." But that market having been demolished in 1572, we have no information of its construction.

Note 2.p.80. Sauval. Book IV.

HERSE. Portcullis.

A heavy open frame composed of iron bars or of framed carpentry, sliding in two vertical grooves and forming an obstacle under the opening of a fortified gateway. The portcullis is raised by means of a counterpoise or a windlass; it falls by its own weight. The Romans knew the portcullis; it is seen represented on vignettes of manuscripts of the 9 th and 11 th centuries. Yet in military edifices still standing, we know none earlier than the 12 th century.

We shall have occasion to give a certain number of combinations of portcullises in Art. Porte.

HEURTOIR. Knocker.

A hammer for striking gates. The first knockers seem to have been little mallets suspended on the leaves of portals. (Old French poem).[1]

Note 1.p.81. Li Romans de Berte aus grans pies. Chap. 45. Edit. Techener. 1832.

Iron rings attached to bronze heads outside doors from a very early epoch, also served as knockers, for they often have a ball or enlarged portion, that strikes on a great nail head. Those rings facilitate pulling the leaves, when one desires to close them; further they were a sign of asylum at the doors of certain churches. To demand asylum, it sufficed to seize t the ring. On this subject, Lebeuf [2] says that there was knowledge of that ancient custom (also mentioned by Gregory of T Tours) in the history of the miracles of S. Germain, collected by the monk Heric of Auxerre, under Charles the Bald. In the 16 th century to indicate the action of using the knocker, men said "tabuter" at the door. [3]

Note 2.p.81. Histotre de la ville et du diocese de paris. Vol. I. p.374.

Note 3.p.81. Cymbolum mundi.

Here (1) is one of the oldest ring knockers that we know in France, that is attached to the north door of the cathedral of Puy-en-Velay; it dates from the 11 th century; the bronze head is perfectly preserved; the ring alone has been removed. We give a second one (2), that dates from the beginning of the 13 th century and that is intact; it is attached to the west door of the cathedral of Noyon. Here the head and the ring are of bronze.

But these ring knockers appear to have been especially intended for doors of churches, perhaps because of that tradition of the right of aswlum. At the leaves of the doors of houses, the knockers are originally mallets, as we have just stated, then later were hammers suspended by two pins. The most ancient of which we have been able to procure drawings are v very simple in form (3), [1] and are only ornamented by engravings with the graver, that cover the head of the hammer as well as the two eyes holding its pins. Knockers of the 15 th century are less rare; a very beautiful one exists on the leaf of the door of the hospital of Beaune. [2] Here is another that comes from Chateaudun and which is of the same epoch (4). The pins of the hammer are protected from wet by a little shed roof p pierced by a dormer. The whole is of wrought iron of pretty work. One of the most beautiful comes from a house of Troyes (5), and it is now deposited in the archaeological museum of the city. It likewise belongs to the 15 th century, and the

Note 1.p.23. A knocker that seems to us to be of the 14 th century, and that comes from a door in a house of Verdun.

Note 2.p.23. See L'Ermitt. oto. et doc. by Mm.Verdier & Pot-tier. [illegible]

In the 15 th century man resorted to knockers in the form of the ring or rapper with a weight at the end, for the doors of mansions and houses. There exist very pretty ones of this kind in the museums of the Louvre and of Cluny. Knockers with hammers were scarcely longer in use except for the doors of rural habitations.

There were also knockers at the gates of strong castles.-- "Attach the knight that knocks at the gate; and the same out."[1] [illegible]. [illegible] based to possess doors without importance, or to the gates of ecclesial edifices.

Note 1.p.25. Le chronicle de Saint (12 th century). Chap. 12; [illegible] was [illegible] by the Langrehl [illegible] Paris. 1861.

"Knockers have disappeared from our houses and mansions to give place to bells, which have the advantage of announce the arrive our friend if some believed immediately the door to be opened in the middle of the night.

[illegible]

[illegible]

From the 11 th century there were clocks in cathedrals and castles. Those clocks were generally placed in the interior i like great clocks of factories. That season was continued un-til the 16 th century. But bells announced the hours on the [illegible].

[illegible]

[illegible]

hammer no longer moves on the two pins, but is suspended by an eye through which passes a bolt. Before the stem of the knocker, on a corbel very delicately forged and chiseled, is placed a child holding a shield of arms with vair and charged with a leopard in chief. This little figure is a very remarkabla piece of forging. At A is seen the profile of the hammer, half full size. Probably the shield was painted in the colors of the arms.

Note 1.p.83. A knocker that seems to us to be of the 14 th century, and that comes from a door in a house of Vezelay.

Note 2.p.83. See L'Archit. civ. et dom. by MM.Verdier & Cattois. Vol. 9. p.8.

In the 16 th century men returned to knockers in the form of the ring or rapper with a weight at the end, for the doors of mansions and houses. There exist very pretty ones of this kind in the museums of the Louvre and of Cluny. Knockers with hammers were scarcely longer in use except for the doors of r rural habitations.

There were also knockers at the gates of strong castles.-- "Attend the knight that knocks at the gate; and one came out."[1] But it must be admitted, that these knockers could only be attached to postern doors without drawbridges, or to the gates of external barriers.

Note 1.p.85. La Chronicle de Reins (13 th century). Chap. 31. published from the manuscript of the imperial Library by Lewis. Paris. 1837.

Knockers have disappeared from our houses and mansions to give place to bells, which have the advantage of arousing the entire household if some delayed inmate desires the door to be opened in the middle of the night.

HOPITAL. Hospital. (See Art. Hotel-Dieu).

HORLOGE. Clock.

From the 11 th century there were clocks in churches and castles. Those clocks were generally placed in the interior l like great pieces of furniture. That custom was continued until the 16 th century. But bells announced the hours on the exterior. (Old French poem).[1]

Note 1.p.87. Rutebeuf. Du segrestain et de la femme au chevalier. (13 th century).

William Durand in the 13 th century in Chapter I of his work, regards the clock as one of the essential parts of the church. "The clock," says he, "on which one rests and counts the hours, signifies the promptness and care then the priests must have in any his essential duties." As his [illegible] said, accordant to the word:- "Seven times daily have I praised thee, O Lord."

Note 8.p.87. Chap. 1, part. 18.

Abbot Pierre of Chassellux about 1240 gave to the abbey of Cluny a clock, remarkable in that its mechanism presented a astronomical calendar, with Lunations and Year, Month, Hour, and minute, and an astrological calendar that designated the festivals and the offices of each day. That clock functioned [illegible] and then a number of little moving figures representing the mystery of the Resurrection, Death, S. Peter and S. Odilon, abbots of Cluny, the holy Virgin, the passion, etc. Doors were announced by a cock that flapped his wings and crowed twice; at the same time an angel opened a door and saluted the holy Virgin; the Holy Spirit descended on her head in form of a dove, and the Eternal Father blessed her; a harmonious chime of small bells played an air; fanciful animals moved their [illegible] and [illegible] all the Fathers [illegible] the interior of the clock.

Note 8.p.87. Hist. de l'abbaye de Cluny, by M. P. Lorain. p. 209.

These complicated clocks were in fashion during the 14 th, 15 th and 16 th centuries. Even on the exterior, the bells of the clocks were nearly always accompanied by "jacquemars," who struck the bells with hammers. Some bell-towers of our cities of the north, notably that of Courtrai, have preserved these jacquemarts which enjoy great popularity. Everyone has seen or heard of the celebrated clocks of the cathedrals of Lyons and of Strasbourg. The first internal clock was commenced in 1212 [illegible] in 1571. In the [illegible] of Jean de Lindenberg it consisted of a case in joinery with a great disk of wood, representing in painting the relative indications of the principal moveable festivals. In the middle part was found a dial with hands marked the motions of the sun and moon, the hours and their subdivisions. The top was ornamented by a statuette

William Durand in the 13 th century in Chapter I of his work,[2] regards the clock as one of the essential parts of the church. "The clock," says he, "on which one reads and counts the hours, signifies the promptness and care that the priests must h have to say the canonical hours (prayers) at the required times, according to the word:- "Seven times daily have I praised thee, O Lord."

Note 2.p.87. Chap. I, sect. 35.

Abbot Pierre of Chastellux about 1340 gave to the abbey of Cluny a clock, remarkable in that its mechanism presented a perpetual calendar, that indicated the year, month, week, day, hour and minute, and an ecclesiastical calendar that designated the festivals and the offices of each day. That clock further indicated the phases of the moon, the motions of the sun, and then a number of little movable figures representing the mystery of the Resurrection, Death, S. Hugues and S. Odilon, abbots of Cluny, the holy Virgin, the passion, etc. Hours were announced by a cock that flapped his wings and crowed twice; at the same time an angel opened a door and saluted the holy Virgin; the Holy Spirit descended on her head in form of a dove, and the Eternal Father blessed her; a harmonious chime of small bells played an air; fanciful animals moved their wings and eyes; the hour sounded, and all the figures retired into the interior of the clock.[3]

Note 3.p.87. Hist. de l'abbaye de Cluny, by M. P. Lorain. p. 208.

Those complicated clocks were in fashion during the 14 th, 15 th and 16 th centuries. Even on the exterior, the bells of the clocks were nearly always accompanied by "Jacquemars," who struck the bells with hammers. Some bell-towers of our cities of the north, notably that of Compeigne, have preserved those Jacquemars which enjoy great popularity. Everyone has seen or heard of the celebrated clocks of the cathedrals of Lyons aud of Strasburg. The first internal clock was commenced in 1312 ind finished in 1354, in the episcopate of Jean de Lichtenberg; it consisted of a case in joinery with a great disk of wood, representing in painting the relative indications of the principtal movable festivals. In the middle part was found a dial with hands marking the motions of the sun and moon, the hours and their subdivisions. The top was ornamented by a statuette

of the Tiretin, before which at the hour of noon bowed the ma-
ras mar; the cook covered as she same lodgment and flapped his
wings. Small [illegible] stood stay at certain centre. That clock
was replaced in 1847, then rebuilt in 1888: that is the one
which we see today on the wall of the modern transept, conspi-
te the place reserved for the old clock.[1]

*Note 1.p.88. Pano. ofrep. de l'horloge ostion. de la cath
de Strasbourg. 1847.*

There are also some in the cathedrals of Quarcia and of St
Louis [illegible], where [illegible] from the 16 to century. Ter
have this [illegible] still conserved in the cathedrals [illegible]
by V. Gallaraado.

Note 2.p.88. L'Atom. du Ve on XVIIe siecle . Vol. IV.

On the towers of the 12 to and 13 to centuries no place is
assigned for placing dials that can be seen aler; this causes
the supposition that before the 1. to century, if the bells
indicated the hour to the inhabitants of the cities, there
were no mechanical dials. These were not seen to appear until
about the end of the 14 to century. They are covered by lite-
le boxes, made of wood or lead, and covered by painting.

[illegible] -

The name of tonsion (ostel) was given to habitations in cir-
ties, that belonged to lords or to rich private men, but which
did not have the character of the castle, i.e., possessed no
feudal rights.

The residence of the aristocrat in -aris was called the p
palace. The Louvre was built outside the walls and was a cas-
le. The other residences of aristocrats established in Paris
that had no feudal character, were no longer named palaces,
but mansions. Van Ard [illegible] F. Fol, the Tournelles. Two
mansion of Olaty, Sens, Bourbon, Navers, Tournelle. At Bourges,
the residence of Jacques Ceur was an civil mansion. However,
to not confuse the minds of our readers, we have placed the
mansions in Art. Vision, the difference between mansion and
house being frequently difficult to establish.

[illegible] Hall.

[illegible] The military [illegible]
the 11 to century in a certain number of cities, and that had

of the Virgin, before which at the hour of noon bowed the three magi; the cock crowed at the same instant and flapped his wings. Small chimes played airs at certain hours. That clock was replaced in 1547, then rebuilt in 1838; that is the one which we see today on the wall of the south transept, opposite the place reserved for the old clock.[1]

Note 1.p.88. Desc. obreg. de l'horloge astron. de la cath de Strosbourg. 1847.

There are also seen in the cathedrals of Beauvais and of Rh Rheims clocks, whose cases date from the 14 th century. They have both been very well engraved in the collection published by M. Gailhabaud.[2]

Note 2.p.88. L'Arch. du Ve ou XVIIe siecle . Vol. IV.

On the towers of the 12 th and 13 th centuries no place is arranged for placiug dials that can be seen afar; this causes the supposition that before the 1, th century, if the bells indicated the hour to the inhabitants of the cities, there were no external dials. These were not seen to appear until about the end of the 15 th century. They are covered by little hoods, made of wood or lead, and covered by paintings.

HOTEL. Mansion.

The name of mansion (hotel) was given to habitations in cities, that belonged to lords or to rich private men, but which did not have the character of the castle, i.e., possessed no feudal rights.

The residence of the sovereign in Paris wal called the p palace. The Louvre was built outside the walls and was a castle. The other residences of sovereigns established in Paris that had no feudal character, were no longer named palaces, but mansions. Men said mansion S. Pol, des Tournelles. Laso mansion of Cluny, Sens, Bourbon, Nevers, Tremoille. At Bourges, the residence of Jacques Coeur was an actual mansion. However, to not confuse the minds of our readers, we have placed the mansions in Art. Maison, the difference between mansion and house being frequently difficult to establish.

HOTEL DE VILLE. City Hall.

House of the commune. The political movement manifested from the 11 th century in a certain number of cities, aud that had

as the result of the enfranchisement of the commune, naturally sought to centralize the commune by erecting an edifice s suited to contain the swory officials. Always when the charter of a commune was granted, the right of erecting a house of the commune and a bell tower was included. But until the 14 th century, the communes had to suffer such various changes, authorized today and abolished tomorrow, that there remains very little of the city halls preceding that epoch, the first act of authority that abolished the commune being to require the demolition of the city hall and bell tower. "The histories of the communes," says M. Champollion-Figeac,[1] "sometimes belonged to the king or the sovereign lords, who permitted their use on certain conditions. In 1271, that of Carcassonne came from a royal gift, and the seneschal exercised there police powers in the name of that monarch.[2] That of the city of Limoges in 1275 belonged to the viscount and his son of that name, who allowed the consuls to assemble there with the provost to discuss municipal affairs, and it bore the name of consula e. Yet it had been erected by the commune; but when it was on a site belonging to the viscount, this was the reason why the property was adjudged to him on his demand."

Note 1.p.89. Droits et usages concernant les travaux de construction, etc. sous la troiseme race des rois de France. Paris. 1860.

Note 2.p.89. One will note that the citizens of Carcassonne driven out of the old city after the siege laid by Trincavel, obtained from king S. Louis permission to rebuild their city on the other side of the Aude. (Art. Architecture Militaire) .

The precarious state of the communes, the small resources at their disposal for paying all charges imposed on them, must often stop them in their projects for building city halls. Y Yet certain great cities, for example like Bordeaux, possessed edifices built to serve for city halls about the end of the 12 th century.[3] It is certain that the cities of Gaul situated south of the Loire had retained, much better than those of the north, the municipal traditions of the last times of the Roman empire. "It was only there," says M. Aug. Thierry, "that t the freed cities attained the fullness of that republican existence, that was in some sort the ideal to which all communes aspired." So those cities possessed edifices to which one

give the date of hall of the oriental, as an season when in the force was under neither the labours nor the material means necessary for their erection. Certain parts of the capital of Poitiers indicate a very early date, and that municipal hall was an actual fortress from the 12 to century.

Note 3.p.69. See Pull. de. cop. hist. Pab. 1861. notice sur l'hotel de ville de Poitiers, by A. Lemonte.

[illegible]

In the little city of S. Antonin situated in the department of Tarn-et-Garonne, a city formerly important and rich, there still exists the city hall of the middle of the 12 th century. This is certainly one of the most curious civil edifices in France. It served as a hall in the ground story.

The second and third stories each contained a hall and a colonnade. A tower served as well tower and crowned one side of the facade. Figure (1) at A is the plan of the ground story. The doors F served for a covered market and communicated with a market W formerly existing there; at E was the passage of a public street under the hall tower. The sanctuary for assembling of the noble citizens was formerly built at S. but that assign was destroyed long since and was replaced by a screw stairs at V. The part under the hall tower has sufficient some charge to constitute the crypt, which were then already; but some modern alter the primitive construction to be clearly seen. At E is traced the plan of the second story, reached by the floor F opening on the old stairs. This second story consists of a hall S and a cabinet H looked out on the public place by a window E, and on a principal screen by that at T. The floor of that cabinet is raised several steps above that of the hall. The plan O is that of the third story. The entrance door called formerly pierced at T', from the cabinet W' one ascended to the main turret of the hall tower by a wooden stairs [illegible] vaulted tunnel vault covering the area a b c d. The principal hall S in the second story is abundantly lighted by a beautiful colonnade, always arranged to be glazed.

We give (2) the elevation of that edifice, whose house part alone is modern,[1] and (3) is a detail of the arches of the a second story. At A is traced the section of that window at the floor R, and the arch O of the ground story. At C we have

give the name of hall of the commune, at an epoch when in the North men had neither the leisure nor the material means necessary for their erection. Certain parts of the Capitol of To Toulouse indicate a very early date, and that municipal hall was an actual fortress from the 12 th century.

Note 3.p.89. See Bull. de. com. hist. Feb. 1851. Notice sur l'hotel de ville de Bordeaux, by M. Lomothe.

Note 4.p.89. Lettres sur l'hist.de France. (13 th century).

In the little city of S. Antonin situated in the department of Tarn-et-Garonne, a city formerly important and rich, there still exists the city hall of the middle of the 12 th century, that is certainly one of the most curious civil edifices in France. It served as the hall in the ground story.

The second and third stories each contained a hall and a cabinet. A tower served as bell tower and crowned one side of the facade. Here (1) at A is the plan of the ground story. The space H served for a covered market and communicated with a market M formerly existing there; at P was the passage of a public street under the bell tower. The stairway for ascending to the upper stories was formerly built at E, but that stairs was destroyed long since and was replaced by a screw stairs at V. The part under the bell tower has suffered some changes to consolidate the piers, which were much altered; but those changes allow the primitive construction to be plainly seen. At B is traced the plan of the second story, reached by the door F opening on the old stairs. This second stairs consists of a hall S and a cabinet H looking out on the public place by a window R, and on a principal street by that at T. The floor of that cabinet is raised several steps above that of the hall. The plan C is that of the third story. The entrance door being formerly pierced at F', from the cabinet N' one ascended to the watch turret of the bell tower by a wooden stairs, or rather a sort of miller's ladder passing through the pointed tunnel vault covering the area a b c d. The principal hall S in the second story is abundantly lighted by a beautiful colonnade, always arranged to be glazed.

We give (2) the elevation of that edofice, whose upper part alone is modern,[1] and (3) is a detail of the windows of the second story. At A is traced the section of that window with the floor B'. and the arch C of the ground story. At D we have

presented the exterior of a nave (one bay) of the church, and as a rib internal elevation, presented semes and adjust the upper and lower wooden cross-bars [illegible]. The construction of the entire monument is treated with care, built in very hard stone of the country; the sculpture is of a refinement and remarkable purity, all the moulding being in excellent style and sure in perfection. Pieces of assembled fragments are taken in the stone and ornament certain parts of the frame. On one of the two pieces that divide the opening into three bays is seen a statue of a crowned personage holding a book in the right hand, in the left being a long sceptre terminated by a [illegible]; on the other is a group of Adam and Eve tempted by the serpent. These figures are in high relief and small, are of a peculiar appearance and sculptured with extreme delicacy of details. Some have wished to see Moses, others Melchisedec, and still others the King contemporary with the monument. Tiran great difficulty some years since, we were able to discover on one open book parts of a printed inscription.

Note 1.p.91. This edifice was restored under the direction of the Historical Monuments s. The restoration was however limited to the construction of the rear stairs, to the top of the tower, that threatened ruin, and to the removal of the flowers see Arch. etc. et dom. of Vk. Verdier and Bottiée.

Note 2.p.91. We have been able to find only fragments of the these Frisons dibes, that were from 11.8 to 15.7 lns. diam.

To have here the rustic traces of that painting on the two pages (4): Tuscan, which-e monsing we have been unable to ascertain. Perhaps some archaeologist will be more fortunate than we. Without giving here our opinion for anything but a few hypotheses, we may see in that style Ionist as rular: Ionic pedes and Doric cornices.

The lucile columns and capitals of the covering, its entrance and the windows were colored: on the walls of the nave covered by plaster, we have been able to prove traces of painting at two points (1m 50 and 15 to centimeter). Behind the capitals of the ground story was a place that was always sepulcher [illegible] under the arches of the ground story.

If we still see in the north of Germany and in Belgium city halls of a pretty early epoch, like those of Lubeck, Nix-la-

presented the exterior of a part (one third) of the windows, and at E its internal elevation. Casement sashes shut against the upper and lower wooden cross-bars C. The construction of the entire monument is treated with lare, built in very hard s stone of the country; the sculpture is of a refinement and r remarkable purity, all the mouldings being in excellent style and cut in perfection. Dishes of enameled faience are inlaid in the stone and ornament certain parts of the facade.[2] On one of the two piers that divide the opening into three bays is seen a statue of a crowned personage holding a book in the right hand, in the left being a long sceptre terminated by a bird; on the other is a group of Adam and Eve tempted by the serpent. These figures are in high relief and small, are of b beautiful character and sculptured with extreme delicacy of details. Some have wished to see Moses, others Charlemagne, a and still others the king contemporary with the monument. With great difficulty some years since, we were able to discover on the open book parts of a painted inscription.

Note 1.p.91. This edifice was restored under the direction of the Historical Monumen s. The restoration was however limited to the construction of the rear stairs, to the top of the tower, that threatened ruin, and to the renewal of the floors. See Arch. civ. et dom. of MM. Verdier and Cattois.

Note 2.p.91. We have been able to find only fragments of th those faience dishes, that were from 11.8 to 15.7 ins. diam.

We give here the visible traces of that painting on the two pages (4); traces, whose meanging we have been unable to determine. Perhaps some archaeologist will be more fortunate than we. Without giving here our opinion for anything but a new h hypothesis, we may see in that statue Christ as ruler; Christ reigns and Christ commands.

The little columns and capitals of the opening, its enclosure and the windows were colored; on the walls of the halls c covered by plaster, we have been able to prove traces of paintings at two epochs (1[illegible] th and 15 th centuries). Behind the portico of the ground story was a place that has always served as a market; formerly one could reach it only by passing under the arches of the ground story.

If we still see in the north of Germany and in Belgium city halls of a pretty early epoch, like those of Lubeck, Aix-la-

Chapelle, built in the 13 th century, those of Brunswick, Dantzig, Munster, Ratisbon, erected during the 14 th and 15 th centuries, we no longer possess in France edifices of that ki kind, except that of S. Antonin, preceding the end of the 15 th century and the beginning of the 16 th. One can still study the city halls of that epoch at Orleans, Compiegne, Saumur, Luxeuil, Beaugency, S. Quentin. The most complete of all and most remarkable is certainly the city hall of Compeigne, engraved with much care in the work of MM. Verdier and Cattois.[1]

Note t.p.94. Arch. civ. et dom. etc. Vol. 1.

That edifice is composed of a single building with a grand winding stairway in the central part of the front; that stairway is crowned by a very pretty bell tower. In the ground story, the second and third stories, great halls are arranged a at right and left of the central tower. Above the portal a w wide recess was filled by an equestrian statue of Louis XII. Two projecting turrets flank the two angles of the building. One will note that this tradition was again followed in the city hall of Paris, erected during the 16 th century and finished under Henry IV.

Several causes contributed to deprive French cities north of the Loire of buildings intended for municipal meetings. Until the 15 th century, the enfranchisement of the communes, although it had consequences important from a political poin t of view, had been able to establish itself in a permanent manner only with very great difficulty. About the end of the 12 th century the bishops, either to reconquer the diocesan authority, that had been in great part taken from them by the religious establishments, or to find a point of support in their attempts to infringe on the lay feudal power, began the erection of immense cathedral churches at Noyon, Senlis, Sens, Paris, Amiens, Chartres, Troyes, Bourges, Rheims, Soissons, Laon, Cambrai, Arras, Beauvais, Auxerre and Rouen, to the construction of which the urban peoples had brought an enthusiasm the more active, as these edifices then assumed a character civil and religious. The citizens were called by the bishops to a assist in the erection of the monument, with the assurance t that this monument should be open for their assemblies, and long regarded the cathedral as a municipal edifice in those cities dependent or near the royal domain. And we see indeed,

that until the 15 th century, the cathedrals not only served for religious services, but for political and social assemblies (Arc. Cathedrale). Thus custom came around, the local people of the north of France felt less the need of erecting city halls, the more that they knew by experience that these municipal edifices soonest measured in the seventeen locks.[1]

The manor of the cathedral edifices then. This it was only in 1452 that Jean of Donatmy obtained the necessary permission to build a city hall at Amiens. "The inhabitants," says Jean-ne,[1] "had more until then; when it was necessary to treat of their affairs, they were accustomed to hold their assemblies in public places or in the cemetery, in the chapters of communities or in religious cloisters. Also in those places were held the festivals, that served for public diversions." Until the 15 th century, the cathedral of Lyon served as the place of assemblage for the inhabitants of the city. Assemblies were held in the 14 th and 15 th centuries in the cathedrals of Auxerre, Paris and of Tours, when it was necessary to deliberate on public affairs. These edifices resumed sometimes of [illegible] were [illegible] there, and even beneath their vaults, was transformed. The branches generally accused themselves against these customs; but it was only very late that they succeeded in destroying them entirely. Consequently the church demand from the France of the 12 th, 13 th and 14 th centuries those vast municipal building of the cities of Italy and of Flanders: they never existed because they had no reason to exist. But also in those provinces north of the Loire, one sees built under a powerful influence the grandest cathedrals ever erected in Christendom at that epoch.

Note 1.p.95. Mem. pour l'Hist. cth. et ecles. d'Auxerre. V Vol. III. p. 197.

In late [illegible] of small city structures in the municipal aggrandisement of Paris, for example, it suffices to read what Sauval wrote on what was the city hall before the middle of the 14 th century. It was only in 1357 that the receiver of the salt tax sold to the provost of the merchants, Etienne Marcel, the house that became definitely the city hall."As for what was is for a building," says Sauval, "it was a little the building with two gables, and that adjoined several cur-

that until the 16 th century, the cathedrals not only served for religious services, but for political and secular assemblies (Art. Cathedrale). That custom being adopted, the urban peoples of the north of France felt less the need of erecting city halls, the more that they knew by experience that those municipal edifices aroused mistrust in the sovereign lords. T The shadow of the cathedral sufficed them. Thus it was only in 1452 that Jean of Burgundy granted the necessary permission to build a city hall at Auxerre. "The inhabitants," says Lebeuf,[1] "had none until then; when it was necessary to treat of their affairs, they were compelled to hold their assemblies in public places or in the churches, in the chapters of communities or in religious cloisters. Also in those places were held the festivals, that served for public diversions." Until the 16 th century, the cathedral of Laon served as the place of assemblage for the inhabitants of the city. Assemblies were held in the 14 th and 15 th centuries in the cathedrals of Auxerre, Paris and of Sens, when it was necessary to deliberate on public affairs. Those edifices retained something of the Roman basilica; markets were installed under their porches, and even beneath their vaults, men trafficked. The bishops naturally aroused themselves against these customs; but it was only very late that they succeeded in destroying them entirely. Consequently one cannot demand from the France of the 12 th, 13 th and 14 th centuries those vast municipal buildings of the cities of Italy and of Flanders; they never existed because they had no reason to exist. But also in those provinces north of the Loire, one sees built under a powerful i impulse the grandest cathedrals ever erected in Christendom at that epoch.

Note 1.p.95. Mem. pour l'hist. civ. et eccles. d'Auxerre. V Vol. III. p. 319.

To form a correct idea of what was precarious in the municipal establishment of Paris, for example, it suffices to read what Sauval wrote on what was the city hall before the middle of the 14 th century. It was only in 1357 that the receiver of the salt tax sold to the provost of the merchants, Etienne Marcel, the house that became definitely the city hall."As for what that is for a building," adds Sauval, "it was a little building with two gables, and that adjoined several citi-

ottrenes' houses." This fact alone gives sufficient information, that city walls in France differed little for the most part from the houses of private persons, until the 15 th century. Yet Bourbourville [1] claims that the city of Gien possessed a house of the somewhat "of very old and admirable construction, from which living butterfly formed on p ulies in the river, that flowed through three great arches (a three city hall was built on the bridge S. Pierre); and at the angles of this edifice and house are four towers connected by castlelets, in one of which (the bell tower) is placed a great clock: which bridge and river, separate the two sides of the city, so that its four walls commerce, and and around that bridge, formerly called de Coquenel, as found by a certain character, delay in the archeology or antiquity of the city, of the year 1565." Indeed in the old plans of t [illegible] a building in form of a small castle (for it was necessary to cross under the city hall to cross the Orne), whose eastern f front is opened towards the great street, that served as a place for fairs. The building is flanked by four turrets and covered by a pic roof; the bell tower was built at the southwest angle. The hall of the assembly was in the second story and had its windows opened toward the river, on the side of the arrival of the ships at the north, and at the south toward the meadows. The situation of this house of the commune was then one of those best chosen for the merchant and industrial city.

Note 1.p.26. Les Bucherolles et antiquites de la province de Berrette, non duchy of Normandy, etc.; by Ch. de Bourbourville. Found by Gien, Ben Saint. 1584.

Note 2.p.28. Notably that of Metten, and that engraved in f Foulquie in the work of Bourbourville. Edit. of 1582.

The arrangement of the houses of the commune from the end of the 12 th century appears to have been nearly the same in the cities of the North from Picardy to Lusack. A bell tower rose at the centre of the facade and was flanked laterally by two great halls or decorated the great building with lateral stairs. The bell tower served as prison of the commune, [illegible] and like a [illegible] [illegible] of bells. Before the facade opened in the ground story

citizens' houses." That fact alone gives sufficient information, that city halls in France differed little for the most part from the houses of private persons, until the 15 th century. Yet Bourgueville [1] claims that the city of Caen possessed a house of the commune "of very old and admirable construction, four stories high, with flying buttresses founded on p piles in the river, that flowed through three great arches (t (this city hall was built on the bridge S. Pierre); and at p the angles of this edifice and house are four towers connected by battlements, in one of which (the bell tower) is placed a great clock; which house, bridge and river, separate the two sides of the city, so that its four walls commence, end and surround that bridge, formerly called de Darnetal, as found by a certain charter, being in the martyrology or chronicle of the city, of the year 1365." Indeed in the old plans of t the city of Caen,[2] one sees represented on the bridge S. Pierre a building in form of a small castle (for it was necessary to pass under the city hall to cross the Orne), whose eastern f front is opened opposite the great street, that served as a place for fairs. The building is flanked by four turrets and covered by a hip roof; the bell tower was built at the southwest angle. The hall of the assembly was in the second story and had its windows opened toward the river, on the side of the arrival of the ships at the north, and at the south toward the meadows. The situation of this house of the commune was then one of those best chosen for the merchant aud industrial city.

Note 1.p.96. Les Recherches et antiquitez de la province de Neustrie, now duchy of Normandy, etc.; by Ch. de Bourgueville, lord of Bras. New edit. Caen. 1833.

Note 2.p.98. Notably that of Merian, and that engraved in f facsimile in the work of Bourgueville. Edit. of 1833.

The arrangement of the houses of the communes from the end of the 13 th century appears to have been nearly the same in the cities of the North from Picardy to Lubeck. A bell tower rose at the centre of the facade and was flanked laterally by two great halls or penetrated the great building with lateral gables. The bell tower served as prison of the commune, for the deposit of the archives, and for a watchman with a c chime of bells. Before the facade opened in the ground story

the porcos aren grand ubarrewya ann a lokeia or ballory for
public appearances. The city of Lonsk still possesses the
remains of a very city hall, which in the 12 th century was
composed of three great adjoining buildings, with three gables
on the front and three oriels on the rear. These gables were
graced by very large windows with tracery, that admirably
lighted those three halls. The grand story was occupied by
secondary services. It is unnecessary to recall here that the
houses of cities of the Nord of the 12 th and 14 th centuries
possessed their fealty to the street. This move was adopted
by the city halls, and at 5. Ganzin also the noble of the com-
mune, whose erection was in the 15 th century, remains the ex-
[illegible] [illegible] [illegible] [illegible] [illegible] [illegible]
more than we have been able to procure on the houses of the
seigniors of those turbe rich and commercial cities of the No-
rth, it is possible to present a type of these structures,
that more than any other have been subject to so many alterat-
ions and constructions. Since it would be much too long and
[illegible] to give separately these scattered documents, we
[illegible] [illegible] [illegible] [illegible] [illegible] [illegible]
them, and presenting a complete by [illegible] of the city hall of the end
of the 12 th century.

This is what we have attempted to do in drawing Fig. 5, wh-
ich gives at A the plan of the ground story of a municipal e
difice, and at B the plan of the second story. Opening the
front corbels at right and left give two stairs and land in
the vestibule D, covered by the lozenge A. On entering the gr-
ound story beneath the vaults of the vestibule the prisons F
of the hall tower, and by the doors C into the halls adorned
for the fairy services. On the second story, from the vestib-
ule D one enters the room I adjoining under the belfry, and I
[illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]
ar halls L, admirably lighted by the windows V.

Fig. 6 presents the perspective of this edifice.

Yet it frequently occurred before the 15 th century, that t
he hall towers were independent of the city hall. Some of T
Tournay, which dates from the 12 th century, is detached. That
of Ghent, whose lower part dates in the 14 th century, was
likewise independent of the house of the commune, as well as
those of Dommines and of Cambrai. Within, in Vol. 5 of his

the portico with grand stairways and a loggia or gallery for public announcements. The city of Lubeck still possesses the remains of a vast city hall, which in the 13 th century was composed of three great adjoining buildings, with three gables on the front and three others on the rear. These gables were pierced by very large windows with tracery, that abundantly lighted those three halls. The ground story was occupied by secondary services. It is unnecessary to recall here that the houses of cities of the North of the 13 th and 14 th centuries presented their gables to the street. This mode was adopted by the city halls, and at S. Quentin also the house of the commune, whose erection was in the 16 th century, retains the principle of that arrangement. By combining the scattered documents that we have been able to procure on the houses of the communes of these three rich and commercial cities of the North, it is possible to present a type of these structures, that more than any other have been subject to so many alterations and catastrophes. Since it would be much too long and wearisome to give separately these scattered documents, we have thought that our readers would not object to our combining them, and presenting a complete type of the city hall of the end of the 13 th century.

That is what we have attempted to do in drawing Fig. 5, which gives at A the plan of the ground story of a municipal edifice, and at B the plan of the second story. Beneath the front portico at right and left rise two stairs and land in the vestibule D, preceded by the loggia E. One enters the ground story beneath the vaults of the vestibule the prisons F of the bell tower, and by the doors G into the halls intended for the daily services. On the second story, from the vestibule D one enters the room I situated under the belfry, and from thence the first hall K serving as vestibule to two great halls L, abundantly lighted by the windows M.

Fig. 6 presents the perspective of this edifice.

But it frequently occurred before the 15 th century, that the bell towers were independent of the city hall. That of Tournay, which dates from the 12 th century, is detached. That of Amiens, whose lower part dates in the 14 th century, was likewise independent of the house of the commune, as well as those of Commines and of Cambrai. Millin, in Vol. 5 of his

Antoniazzo Romano, gives a view of the city wall of the city of Ville, depicted in 1464, and reproduced from a drawing in the library of S. Pietro. According to that drawing the [illegible] building is already a well built, and massive of a three story structure with two great gables and turrets at the angles. The base of the roof has battlements. Behind the building rises a lower structure with battlements a surmounted by lions and by two statues of savages, one of which bears the standard of the city. These structures, so far as any [illegible] [illegible] [illegible], belong to the 13 th century. If many very old cell towers of the orders of the Monks are designed, that of Ferrara S. Giorgio, which dates from the 14 th century, is already otherwise, corresponding to the needs of the [illegible] of that city, as does that of our Fig. 5. One will note that the [illegible] bell tower is at the middle of the principal building and on its facade; only it penetrates the great and deep building on two [illegible] placed laterally, yet so as to present in the second story a plan similar to that in Fig. 5.

[illegible]

Nothing proves that the monkeys had houses of refuge for the sick, where they could receive the care of physicians and [illegible]. [illegible] the cost of the troubles; but it is [illegible] this aid was anything more than a mirage; besides that this fact does not seem to have existed in other cities of Greece. At Sparta, after the battle lost by the Lacedemonians against Antigonus, the houses of the citizens were opened to receive the wounded. The Romans in a campaign had places reserved for sick men and horses; but no author mentions, neither at Rome nor in the cities of the empire, hospitals intended for wounded soldiers or for the sick poor. S. Jerome first speaks of a certain Fabiola, a certain very wealthy Roman lady, who founded about the year 390 a hospital in which were received the sick, previously lying abandoned in the streets and on the public places. In the first years of the middle ages, indeed in the cities of Italy, Venice and Barcelona, there were [illegible] [illegible] one for the care and shelter of the sick, travelers and the poor. At the origin these foundations consisted in destroying

Antiquities nationales, gives a view of the city hall of the city of Lille, demolished in 1664, and reproduced frsm a drawing in the library of S. Pierre. According to that drawing the principal building is without a bell tower, and consists of a three story structure with the two great gables and turrets at the angles. The base of the roof has battlements. Behind the building rises a lower structure with battlements s surmounted by lions and by two statues of savager, one of which bears the standard of the city. These structures, so far as the imperfect drawing allows the recognition, appear to b belong to the 13 th century. If many very old bell towers of the cities of the North are detached, that of Bergues S. Winox, which dates frsm the 14 th century, is arranged otherwise, c corresponding to the house of the commune of that city, as do-does that of our Fig. 6. One will note that at Compeigne the bell tower is at the middle of the principal building and on its facade; only it penetrates the great and deep building with two gables placed laterally, yet so as to present in the second story a plan similar to that in Fig. 5.

HOTEL-DIEU. Hospital. Leper Hospital.

Nothing proves that the ancients had houses of refuge for t the sick, where they could receive the care of phnsicians and await their cure. At Athens maimed sildiers were supported at the cost of the republic;[1] but it is not stated tha this aid was anything more than a pension; besides that this fact does not seem to have existed in other cities of Greece. At Sparta, after the battle lost by the Lacedemonians against Antigone, the houses of the citizens were opened to receive the wounded.[2] The Romans in a campaign had places reserved for sick men and horses; but no author mentions, neither at Rome nor in the c cities of the empire, hospitals intended for wounded soldiers or for the sick poor. S. Jerome first speaks of a certain Fabiola, a certain very wealthy Roman lady, who founded about the year 380 a hospital in which were received the sick, previously lying abandoned in the streets and on the public places. In t the first tomes of the middle ages, indeed in the cities of Italy, France and Germany, there were made numerous foundations for the care and shelter of the sick, travelers anf the poor. At the origin thise foundations consisted in bestowing

a house or place with a secretual income. Usually the peculiar religious establishments, chapters and even bishops were guardians of the foundation. "The earliest mention of the hospital Hotel-Dieu of Paris," says V. Guerard in his preface to the cartularies of the church of Notre Dame of Paris,"certainly was in the year 829." Du Breuil [4] admits that this establishment was founded by S. Landry, 29 in diocese of Paris, about 650. William of Nangis states in the Vie de cet S. Landry, that this prince consideraole enlarged it in 1298. Lecouf [5] claims that this nosocial still bore the name of S. Christopoe in the 10 th century; he finds no proofs that S. Landry essoiiseed near Notre Dame a lepor nosorial or a nosocomial. So says, "that one should distinguish between a nosorial, Hotel-Dieu, and a lepor nosorial. I have much difficulty in believing that lepor nosorials were originally near the cathedrals, which were built in the inferior of cities. For reasons that could not do without, I confess that they could have been given hospitality in that quarter until the second rise of our kind. [illegible]," he adds, "that it is [illegible] [illegible] Dieu." In 1184 under the episcopate of Maurice de Sully, the number of beds was increased because of a measure of the chapter of Notre Dame. It was decided that all the canons that o pass to die or resigned their prebends, should give to that [illegible] a [illegible]. [illegible] place of King Philip Auguste, made a gift to the Hotel-Dieu of two houses in Paris, so that from the rent of those houses, [illegible] stock all that came into their desire to use."

Note 1.p.100. Plutarch. Life of Solon. Chap. 21.

Note 2.p.100. Jusein. Histoire. Book 28.

Note 3.p.100. Coll. des doc. ined. sur l'hist. de France. Vol. I. Paris. 1858.

[illegible]

Note 5.Hist.de la ville et du diocc. de paris. Vol.I.p.22.

During the 11 th, 12 th and 13 th centuries, there was [illegible] a prodigious number of nosocomia; nearly all monks had a [illegible] [illegible] [illegible] [illegible] a great number of lepor nosocomia outside the cities. "The h

a house or place with a perpetual income. Naturally the regular religious establishments, chapters and even parishes were guardians of the foundation. "The earliest mention of the hospital Hotel-Dieu of Paris," says M. Guerard in his preface to the cartularies of the church of Notre Dame of Paris, "perhaps was in the year 829." Du Breuil [4] admits that this establishment was founded by S. Landry, 28 th bishop of Paris, about 660. William of Nangis states in the Vie du roi S. Louis, that this prince considerable enlarged it in 1258. Lebeuf [5] claims that this hospital still bore the name of S. Christophe in t the 10 th century; he finds no proofs that S. Landry established near Notre Dame a leper hospital or a hospital. He says, "that one should distinguish between a hospital, Hotel-Dieu, and a leper hospital. I have much difficulty in believing that leper hospitals were originally near the cathedrals, which w were built in the interiors of cities. For natives that could not do without, I confess that they could have been given hospitality in that quarter under the second race of our kings. Perhaps," he adds, "that with more profound researches one w would find the epoch of the change from the hospital or house of hospitality to that cathedral to a leper hospital or Hotel-Dieu." In 1168 under the episcopate of Maurice de Sully, the number of beds was increased because of a statute of the chapter of Notre Dame. It was decided that all the canons that c came to die or resigned their prebends, should give to that hospital a furnished bed. Thirty years after that rule, Adam, cleric of king Philip August, made a gift to the Hotel-Dieu of two houses in Paris, so that from the rent of those houses, on the day of his anniversary, there should be supplied to the sick all that came into their desire to eat."

Note 1.p.100. Plutarch. Life of Solon. Chap. 31.

Note 2.p.100. Justin. Historio. Book 28.

Note 3.p.100. Coll. des doc. ined. sur l'hist. de France. Vol. 1. Paris. 1858.

Note 4.p.100. Theat. des antiq. de Paris. 1612. Book I.p.74.

Note 5.Hist.de la ville et du diec. de paris. Vol.I.p.22.

During the 11 th, 12 th and 13 th centuries, there was founded a prodigious number of hispitals; nearly all abbeys had a hospital within their enclosure. Further, there were founded a great number of leper hospitals outside the cities. "The h

house of S. Lazare, "says Debouf, "must not be regarded as a celebrated lazar hospital. As much as the city of Paris was famous, so was its lazar hospital of its kind. It was in the 12 th century, that men commenced to have more care to secure lazars from the rest of the people; from the season of the origin of all those lazar hospitals named S. Lazare, whose remains are still seen near an infinity of market towns and villages of the realm. From the reign of Louis the Young, there was built between Paris and S. Denis a hospital for lazars, which consisted of a house of several beds in which they were confined. John of Dreux, a monk of S. Denis, whose name we was a witness in the year 1177, on Wednesday, June 11, our this same King, coming to take the standard at S. Denis bestowing in the cloister entered that hospital situated on his route, and took the trouble to visit the lazars in their [illegible]

[illegible] hospital from the end of the 12 th century was covered by 9 the religious of the order of S. Augustine. Lazar hospitals to the number of 2000 were in the kingdom of the King of France in [illegible]

in his will of the month of June, 1224." We shall not seek to ascertain here whether leprosy was imported into France by the crusaders returned from Palestine, or if as claimed by some authors, that malady already existed on the soil of western Europe from the Celtic epoch.[2] What is difficult to deny is, that this or a certainly similar disease, either was or was believed contagious, spread over the entire area of Europe in the 12 th century, even in countries that had sent no pilgrim to Palestine, since associated to western Paris, there was counted no less than 19,000 lazar hospitals in France, Germany, England, Italy, Spain, Prussia, Netherlands, Poland, Bavaria and in the states of Denmark. Those establishments were situated outside the cities, as we have just seen, and consisted of an enclosure in which rose cells, very similar to those of the Carmelites with a common school. The religious who had the temporal and spiritual care of the lazar hospitals lodged in buildings near the enclosure.

[illegible]

part 2, p. 121.

Note 2.p.101. Zotin note.

house of S. Lazare, "says Lebeuf,[1] "must not be regarded as a celebrated leper hospital. As much as the city of Paris was famous, so was its leper hospital of its kind. It was in the 12 th century, that men commenced to have more care to separate lepers from the rest of the people; from the epoch of the origin of all those leper hospitals named S. Lazare, whose remains are still seen near an infinity of market towns and villages of the realm. From the reign of Louis the Young, there was between Paris and S. Denis a hospital for lepers, which consisted of a group of several huts in which they were confined. Odon of Dueil, a monk of S. Denis, wrote that he was a witness in the year 1147, on Wednesday, June 11, how this same king, coming to take the standard at S. Denis before starting in the crusade entered that hospital situated on his route, and took the trouble to visit the lepers in their cells, accompanied by only two persons." This celebrated leper hospital from the end of the 12 th century was governed by t the religious of the order of S. Augustine. Leper hospitals to the number of 2000 were in the states of the king of France in the 13 th century, as proved by a donation made by Louis VIII in his will of the month of June, 1225.[2] We shall not seek to establish here whether leprosy was imported into France by the crusaders returned from Palestine, or if as claimed by some authors, that malady already existed on the soil of western Europe from the Celtic epoch.[3] What is difficult to deny is, that this or a certainly similar disease, either was or was believed contagious, existed over the entire area of Europe in the 12 th century, even in countries that had sent no person to Palestine, since according to Matthew Paris, there were counted no less than 19,000 leper hospitals in France, Germany, England, Italy, Spain, Brabant, Switzerland, Bohemia, Poland, Bavaria and in the states of Denmark. Those establishments were situated outside the cities, as we have just stated, and consisted of an enclosure in which rose cells, very similar to those of the Carthusians with a common chapel. The religious who had the temporal and spiritual care of the leper h hospitals lodged in buildings near the church.

Note 1.p.101. Hist. de la Ville et dioc. de Paris. Vol.I, part 2, p. 481.

Note 2.p.101. Latin note.

Note 8.p.101.See the curious work of M. Lucquet, Recherches sur l'orthème des lépreux, malades et lépreuseries. Paris. 1824.

It is clear that monkish arrangements had nothing to do with those analogues which scattered huts. It is not the same for the hospitals. These reach us from the epoch of the middle ages, and particularly from the 12 th and 13 th c centuries, admirable buildings devoted to the sick collected in the monasteries, in the vicinity of cathedrals, or even in flourishing cities. Each monastery possesses its almoners, i. e. [illegible] with administrative responsibility. Rather the middle ages, hospitality was obligatory. From the Carlovingian epoch special taxes intended to succor the poor, pilgrims and the sick. Charlemagne in his capitularies and ordonnances, and recommended to his subjects to offer hospitality, and "it was not permitted to refuse travelers shelter, fire and water."[1] The communes emulated the kings, the lords and simple private [illegible]. [illegible] relinquished [illegible] in an their expenses, either in new buildings, or in abandoned edifices, that were restored in view of this purpose. Hospitals were even built in isolated places to serve as refuges f for travelers, and to protect them from the thieves that infested the roads: these buildings were often founded by seculars under the care of the religious. Orders were mainly sent at night, and delayed travelers were compelled to lie the n night in the open air: houses of refuge, a sort of free inns, stood not far from the roads." In 1202 two German nobles dedicated to remedy that serious inconvenience and caused the building of a refuge charitable place [illegible]. Paris at Paris. A [illegible]. A great hall of our house erected at the middle of the ground by means of open arches, was built for the poor to sleep therein; it was 140 fe. long and 34.4 fe. wide." [2] In 1210 the number [illegible] vad and in money from the private purse of the King of France was about 800: in the authors of Paris alone, 49 infirmaries [illegible] by those gifts. Public and private charity also kept on now to make its aid more efficient by founding hospitals for particular diseases. M. Louis gave the example by causing the erection of a hospital of the Trinity for the pilgrims of Pa-

Note 3.p.101.See the curious work of M. Lebourt. Recherches sur l'origine des ladreries, malodreries et leproseries. Paris. 1854.

It is clear that architectural arrangements had nothing to do with those enclosures with scattered huts. It is not the same for the hospitals. There remain to us from the epoch of the middle ages, and particularly from the 12 th and 13 th c centuries, admirable buildings devoted to the sick collected in the monasteries, in the vicinity of cathedrals, or even in flourishing cities. Each monastery possessed its almoners, i. e., persons charged with exercising hospitality. During the middle ages, hospitality was obligatory. From the Carlovingian epoch existed taxes intended to succor the poor, pilgrims and the sick. Charlemagne in his ordinances and capitularies, had recommended to his subjects to offer hospitality, and"it was not permitted to refuse travelers shelter, fire and water."[1] The communes emulated the kings, the lords and simple private men, in works of benevolence. Many cities established hospitals at their expense, either in new buildings, or in abandoned edifices, that were restored in view of this purpose. Hospitals were even built in isolated places to serve as refuges f for travelers, and to protect them from the thieves that infested the roads; these buildings were often founded by cenobites under the care of the religious. Cities were usually shut at night, and delayed travelers were compelled to pass the n night in the open air; houses of refuge, a sort of free inns, arose not far from the gates." In 1202 two German nobles desired to remedy that serious inconvenience and caused the building of a refuge outside gate S. Denis at Paris. A site containing about three acres was rapidly covered by buildings. A great hall of cut stone erected at the middle of the ground by means of open arches, was built for the poor to sleep there; it was 140 ft. long and 38.4 ft. wide."[2] In 1310 the number of hospitals, infirmaries and leper hospitals that received aid in money from the private purse of the king of France was about 500; in the suburbs of Paris alone, 48 infirmaries benefited by those gifts. Public and private charity also knew how to make its aid more efficient by founding hospitals for particular diseases. S. Louis gave the example by causing the erection of a hospital of the Eighty for the blind of Pa-

[illegible]

Note 1.p.102. See Droits et usages, etc. by Champollion-Figeac, [illegible].

Note 2.p.102. See the same.

We will understand that among so many origins assigned under the imagination of living charity, desiring at once to a poor a remedy to the evil, many were merely mud novels, nothing that were assumed good or bad to the service of the poor and sick; for a number of those refuges commanded of a convent given by a simple citizen with an income received from his property. Gradually these modest donations extended and were enriched by collections, becomes increase establishments.

Paris; without mentioning the leper hospitals, there were founded in many cities hospitals for the lame, idiots, poor old men, and maternity. The confraternities also desired to have their houses of refuge and hospitals, and finally, during the pestilences that desolated the cities of the middle ages, bishops and lay lords loaned places belonging to their residences for the care of the sick, and frequently themselves also desired to assist them. Beside the disorders of every nature and the numberless abuses that mark that epoch, it must be recognized that all, small and great, sought to mitigate the fate of the suffering classes by the most efficient means, and that the spirit of charity was never more active than in those times. It must be stated, that frequently a certain lord that founded a hospital when dying, during his life had caused more misfortunes than could be relieved in a long time in the house erected by him. The middle ages are so made; they are an unlimited mixture of good and evil; so that there is much injustice in presenting that epoch as a time of continual misery, as an age of living faith, charity and wisdom. Everywhere beside an evil or monstrous abuse will be found the feeling of right, respect for man, for his misfortunes and weakness. The word fraternity is not alone in speech, but everywhere finds practical application, and if passion or interest too frequently infringe that sacred law, at least its principle is never scorneda In fact, our great charitable institutions came to us from the middle ages and survive them; it is well to not forget this too much; having profited by the good part of the heritage, perhaps it would be just to be indulgent to its miserable side.

Note 1.p.102. See Droits et usoges, etc. by Chowpollion-Figeoc. p. 188. Paris. 1860.

Note 2.p.102. See the some.

One will understand that among so many edifices erected under the inspiration of living charity, desiring at once to a apply a remedy to the evil, many were merely mud hovels, houses that were assigned good or bad to the service of the poor and sick; for a number of those refuges consisted of a house given by a simple citizen with an income received from his p property. Gradually these modest donations extended and were enriched by collections, becoming important establishments.

In these small rooms to is some hospitals of one marble se-
as, that are remarkable from the point of view of art. Well
small, well ventilated and spacious, they also have this adv-
antage over the similar ones that we built generally today,
of leaving a large space to are, of not depressing the sick
by dark odd and desolate appearance, which characterises a
public edifice of century in our time (with rare exceptions).

Note 1.c.106. It is necessary to recognize that recently a great progress has been made in this line. The hospital of Lorenzetti, those of Vincennes and of Vanves are not only p perfectly appropriate for their purpose; but also as works of architecture,these are made to give the sick house rather pleasant than gloomy.

Among the oldest hospitals that still exist in France must be cited that of Charenton, located near the Caserne, and t the hospital of Angers. The latter is particularly remarkable for its extent and by the services that surround it. Here is the plan.(1). It consists of a great hall A with three aisles, preceded by a cloister, an isolated chapel C, lodgings not u used for other purposes, and a vast supersonde or sanatory O, attached to some provisions of all kinds. The construction of this establishment dates from 1175. The chapel is a little more modern (1174). Also about the same epoch was erected the great cloister for convalescence. Fig. 2 represents a cross secti- on of the great hall, in which four rows of beds could easily find places. The construction of these buildings is excellent. Lighted with care, the corners of the place being in an exc- ellent style. The building for provisions is an edifice remar- kable for its arrangement and details.[1]

Note 1.c.106. See Arch. chr. et com., by Mr Verdier and Cat- tois, Vol. II.

The hospital of Quarteres dates at nearly the same epoch as some vaults cover the last bays. This is an arrangement analo- gous to that of the hospital of Angers, and that appears to have been generally followed during the 12 th and 13 th cent- uries.

In the abbey buildings of S. Jean-des-Vignes of Soissons and of Jarcenno are still seen beautiful halls that were revoted

Yet there still remain to us some hospitals of the middle ages, that are remarkable from the point of view of art. Well built, well ventilated and spacious, they also have this advantage over the similar ones that we build generally today, of leaving a large place to art, of not depressing the sick by that cold and desolate appearance, which characterizes a public edifice of charity in our time (with rare exceptions).[1]

Note 1.p.103. It is necessary to recognize that recently a great progress has been made in this line. The hospital of Charenton, those of Vincennes and of Vezinet are not only p perfectly appropriate for their purpose; but also as works of architecture, these are made to give the sick ideas rather pleasant than gloomy.

Among the oldest hospitals that still exist in France must be cited that of Chartres, located near the cathedral, and t the hospital of Angers. The latter is particularly remarkable for its extent and by the services that surround it. Here is the plan.(1). It consists of a great hall A with three aisles, preceded by a cloister, an adjacent chapel B, lodgings now u used for other purposes, and a vast storehouse or granary C, suited to store provisions of all kinds. The construction of this establishment dates frsm 1153. The chapel is a little more modern (1184). Also about the last epoch was erected the great building for provisions. Fig. 2 presents a cross section of the great hall, in which four rows of beds could easily find places. The construction of these buildings is excellent, treated with care, the capitals of the piers being in an excellent style. The building for provisions is an edifice remarkable for its arrangement and details.[1]

Note 1.p.104. See Arch. civ. et dom., by MM Verdier and Cattois, Vol. II.

The hospital of Chartres dates at nearly the same epoch and today consists of a great hall with three aisles, separated by two rows of columns and bearing a ceiled roof. At the rear three stone vaults cover the last bays. This is an arrangement analogous to that of the hospital of Angers, and that appears to have been generally followed during the 12 th and 13 th centuries.

In the abbey buildings of S. Jeau-des-Vignes of Soissons and of Ourscamp are still seen beautiful halls that were devoted

to the rock. The wall called tomb of the head or Cerberus is the most remarkable and the best understood of all these monumental sepulchres. This is always a great interior divided in three aisles, that of the middle being wider than the two others; the nave is covered by ogive vaults and a vast attic.

Fig. 3 represents the plan of that wall near the ancex, that probably served as kitchen and laboratory; Fig. 4 is a transverse section of the great hall for the rock, and Fig. 5 is a one of the nave. One will observe that the windows are arranged to give much light in the interior; the upper ones being much first floor, while the lower can then to ventilate the hall. According to the arrangement generally adopted at that epoch, it must have four rows of beds arranged as on the plan indicated at A; the hall could easily contain 100. Along the walls [illegible] the ends of the ancex [illegible] the entrances for the rock. A great fireplace opening against the table wall B serves satisfaction and warmed of this vast interior.[1] The building and its rooms are lessened. The table wall C is now [illegible] by a little passage d. The entire subterranean house from the first years of the 13 th century, and its interior was painted with red ferrus. The sarcophagi "sabouned with little arches.

Note 1.p.102. For fuller details, see the extraordinary of the Archeze les monuments historiques, published by order of the minister of state; also the work of MM. Tredler and Gottelo successively cited. Vol. II. p. 104.

In Asia. Connecticon, Fig. 102 and following, we have given a building remaining on the shoey of S. Marie le Fresnell, a place which served as the anvian for the poor. Nearly all abbeys once possessed until less sufficiently vast to afford a an anvian for travelers, or even school dissbrais, like that great hall of Cerasans.[1]

Note 1.p.102. The abbey of Cureomp now belongs to M. Pelhne-Delocour, who fortunately preserves with particular care these interesting remains.

The city of Tonnerre possessed already in the 11 th century a hospital situated beside the ancien Notre Dame, according to Lebeuf, and that served as chapel of this establishment another hospital, also of the same epoch, existing in the ano-

to the sick. The hall called that of the dead at Ourscamp is the most beautiful and the best understood of all those hospital structures. This is always a great interior divided in three aisles, that of the middle being wider than the two others; the whole is covered by cross vaults and a vast attic.

Fig. 3 presents the plan of that hall with its annex, that probably served as kitchen and laboratory; Fig. 4 is a transverse section of the great hall for the sick, and Fig. 5 is o one of its bays. One will observe that the windows are aeranged to give much light in the interior; the upper ones being with fixed glass, while the lower can open to ventilate the hall. According to the arrangement generally adopted at that epoch, it must have four rows of beds arranged as on the plan indicated at A; the hall could easily contain 100. Along the walls between the columns are pierced small recesses at the height of the hand for placing the beverages or dressings for the sick. A great fireplace opening against the gable wall B permits sanitation and warming of this vast interior.[1] The building and its annex are detached. The gable wall G is near the transept of the church, with which it probably communicated by a little passage H. The entire structure dates from the first years of the 13 th century, and the interior was painted with red joints, the archivolts festooned with little arches.

Note 1.p.106. For fuller details, see the engravings of the Archives des monuments historiques, published by order of the minister of State; also the work of MM. Verdier and Cattois previously cited. Vol. II. p. 104.

In Art. Construction, Fig. 123 and following, we have given a building dependent on the abbey of S. Marie de Breteuil, a part which served as the asylum for the poor. Nearly all ab-abbeys thus possessed buil ings sufficiently vast to afford a an arylum for travelers, or even actual hospitals, like that great hall of Ourscamp.[1]

Note 1.p.107. The abbey of Ourscamp now belongs to M. Peigne-Delacour, who fortunately preserves with particular care those remarkable remains.

The city of Tonnerre possessed already in the 11 th century a hospital situated beside the church Notre Dame, according to custom, and that served as chapel of this establishment; another hospital, also of the same epoch, existed in the sub-

source of Sunderland. "The dependencies of that hospital," s
ays M. Yamile Dormoia,[2] "consisted only of a little dark c
onvent, a very small house and a garden." In 1704 there lie
lies of Bretaway, founded in the same city the oscolal of F.
Sorrr; but Marchorite of Bretaway, sister-in-law of S. Louis,
and queen of Sicily, desired to endow the city of Tusanere w
ith a [illegible] in 1293 the [illegible] pay an
[illegible] near a spring near Tentenville, along the Aressoon a
nd the walls of the city. In the deed of foundation, it is
assumed that the nuns will be joined in the establishment, the
convalescents be fed for seven days, and sent away with a en-
vet, coat and shoes; that a chapel is to be built with four
altars; that the prioness and sisters to the number of 20, c
[illegible] in the care of the infirmary, shall have as mission
to give to each [illegible] [illegible]
[illegible] and [illegible] them, to clothe the poor, visit the
sick, console prisoners and bury the dead; that the brothers
and sisters shall have separate dormitories and refectories,
and shall only take their meals after serving the sick. The
oscolal was royally erected, and Marguerite caused to be ca-
lls osaing it a house, so as to be able herself to supervise
her arrangements; when she died in 1295, the buildings and
their foundations had already been long concluded. These con-
sin to is the great hall of the oscolal and some fragments,
the one readers will probably not dislike to have given to t
hem are entirely and regards of the principal part of this g
reat hall, as the same size a hospital and a chapel.

Note c.a.107. Notes Hist. sur l'hop. de "Tonnere. Auxerre.

Fig. 6 represents the plan at the scale of 1 : 100. At A is
the great hall, formerly connected by a porch F with another,
house compose of small indices. That hall contained 40 cells
with wooden partitions, a sort of alcove in each of which w
was placed a bed. (See at C). At D was a principal altar ben-
eath the vault, and at F were two chapels likewise vaulted.
The tomb of the foundress was at F and consisted of a bronze
figure lying on a sarcophagus. The sacristy of the chapels w
was at G. At H a rood screen was placed before the choir, and
connected two lateral galleries, that surrounded a continuous
passage above the alcoves, giving the position of the nurses

suburb of Bourberault. "The dependances of that hospital," s says M. Camille Dormois,[2] "consisted only of a little dark c chapel, a very small house and a garden." In 1204 Eudes III, duke of Burgundy, founded in the same city the hospital of S. Esprit; but Marguerite of Burgundy, sister-in-law of S. Louis, and queen of Sicily, desired to endow the city of Tonnerre w with a magnificent hospital. In 1293 she purchased a vast enclosure near a spring named Fontenille, along the Armencon a and the walls of the city. In the deed of foundation, it is stated that the poor will be lodged in the establishment, the convalescents be fed for seven days, and sent away with a shirt, coat and shoes; that a chapel is to be built with four altars; that the brothers and sisters to the number of 20, c charged with the care of the interior, shall have as mission to give to eat and drink to those hungry and thirsty, receive pilgrims and entertain them, to clothe the poor, visit the sick, console prisoners and bury the dead; that the brothers and sisters shall have separate dormitories and refectories, and shall only take their meals after serving the sick. The hospital was royally erected, and Marguerite caused to be built beside it a house, so as to be able herself to supervise her establishment; when she died in 1308, the buildings and their dependances had already been long completed. There remain to us the great hall of that hospital and some dependances, and our readers will probably not dislike to have given to t them the entirely and details of the principal part of that g great hall, at the same time a hospital and a chapel.

Note 2.p.107. Notes Hist. sur l'hop. de Tonnerre. Auxerre. 1853.

Fig. 6 presents the plan at the scale of 1 : 100. At A is the great hall, formerly preceded by a porch B with stairs, w whose purpose we shall indicate. That hall contained 40 cells with wooden partitions, a sort of alcoves in each of which w was placed a bed. (See at C). At D was a priucipal altar beneath the vault, and at F were two chapels likewise vaulted. The tomb of the foundress was at E and consisted of a bronze figure lying on a sarcophagus. The sacristy of the chapels w was at G. At H a rood screen was placed before the choir, and connected two lateral galleries, that established a continuous passage above the alcoves, allowing the opening of the windows

and overcrowd the interiors of the cells. One could ascend to the galleries by the lateral stairs of the porch [1] and by the stairs I, that was in communication with a gallery connecting the towers of the cloaca with the great hall. From her apartments in the second story of that house, this princess could send letters descend into the hall, or transport the cells by walking on the gallery that they supported. At Y was a little chapel. The buildings for the service of the hospital are situated at X and the kitchen at V. Communication from these buildings with the hall was by means of another gallery Y ending in a little door. The public street passes at O. At P was the cemetery; at J the garden of the cloaca, bounded by the wall of the city and by the stream of Montamilie. At R the lazaretto; at V a branch of the Aumoson, and at S the priory. Two auxiliary sources running along two sides of the great hall carried into the river all sewage from the establishment. Besides the walls of the city, remnants surrounded the other parts of the enclosure. At X was the public well.

Note 1.p.108. The accounts of 1576, according to that excellent MS. of L.C., contain [illegible] considered by rebuilding one of those galleries.

[illegible] 10 aune for making the great gallery of the said hospital, 1 129 ft. long and 10.5 ft. wide. To Nicolas, mason, for building the masonry to support the posts of the gallery. To Jehan and Pierre, ex Nothieux, roofers, the sum of 8 livres 12 sous for covering the stairway of the said gallery. To Jehan, merchant, for ironwork for the doors of the hospital and the roofers of the great gallery, etc.

Fig. 7. Alpes Maritimes. Average section of the excavations beneath. [illegible] that is no less than 61.0 ft. wide inside by 229.7 ft. long from the porch to the sanctuary. The section (Fig. 7) shows at A the alcoves with an upper gallery B, passing over the rood screen. One perceives three apses at the back. The carpentry is of oak, well preserved and with timbers of extraordinary length; the tie-beams in one place are 72.2 ft. long; the principals and trussed rafters are 62.4 ft. It is entirely veiled with a round tunnel ceiling already decorated in the interior. At C we have traced one of the trussed rafters and at D the section of a bay of the sanctuary with the ceiling

and overseeing the interiors of the cells. One could ascend to the galleries by the lateral stairs of the porch [1] and by the stairs I, that was in communication with a gallery connecting the house of the queen with the great hall. From her apartments in the second story of that house, this princess could thus either descend into the hall, or inspect the cells by walking on the gallery that they supported. At Z was a little chapel. The buildings for the service of the hospital are situated at K and the kitchen at M. Communication from these buildings with the hall was by means of another gallery N ending at a little door. The public street passes at O. At P was the cemetery; at J the garden of the queen, bounded by the wall of the city and by the stream of Fontenille. At R the laundry; at V a branch of the Armencon, and at S the priory. Two subterranean sewers passing along two sides of the great hall carried into the river all sewage from the establishment. Besides the walls of the city, ramparts surrounded the other parts of the enclosure. At X was the public well.

Note 1.p.109. The accounts of 1556, according to that excellent work of M. C. Dormois cited above, presents expenses occasioned by rebuilding one of those galleries.

"Paid to Jehan Desmoisons, carpenter, the sum of 91 livres 10 sous for making the great gallery of the said hospital, 1 128 ft. long and 12.2 ft. wide. To Nicolas, mason, for building the masonry to support the posts of the gallery. To Jehan and Pierre Les Mathieux, roofers, the sum of 2 livres 13 sous for covering the stairway of the said gallery. To Jehan, merchant, for ironwork for the doors of the hospital and the rafters of the great gallery, etc.

Fig. 7 gives the transverse section of this magnificent interior, that is no less than 61.0 ft. wide inside by 288.7 ft. long from the porch to the sanctuary. The section (Fig. 7) s shows at A the alcoves with an upper gallery B, passing over the rood screen. One perceives three apses at the back. The carpentry is of oak, well preserved and with timbers of extraordinary length; the tiebeams in one piece are 70.2 ft. long; the principals and trussed rafters are 62.4 ft. It is entirely ceiled with a round tunnel ceiling slightly depressed in the interior. At C we have traced one of the trussed rafters and at D the section of a bay of the carpentry with the ceiling

and the vestibules & with 4 ins. openings. The side windows were arranged and arranged so as second from the terrace of the surrounding of the colonnade area, and steps are placed at the a all convinced one to draw the bolts. This inserter exists nearly intact, except the porch, and produces a grand effect. It is one of the most beautiful examples of civil architecture of the period of the Commonwealth. Little has remained unaltered since the entire influence of the commission of historical monuments to obtain its preservation from the city of Tonnere. Why did the city of Tonnere desire to demolish this edifice? One wo- uld probably have been difficulty to learn. Why did the city of Tonnere Tonnere, are not unknown, nor of the most beautiful edifices of the Renaissance? How many cities without any ser- ious cause have deliberately destroyed their ancient family one, I have here when a Parliament existed, and also Versailles, with- out the least doubt that prominent a temple was here a cause case of vandalism, and men were astonished that travele- rs passed with indifference through the midst of their new streets, not even giving a glance at the colonnade facade of the palace or Jussieu, or the facade of the Hôtel Rouillé, cer- tainly mistaken for a barrack.

The necessary in the main to the exceptional in Tonnere, only there is a little more serious difficulty, which can cause- in accordance. Some beautiful cases particular on the windows in Place Gaillard overlook the the valley. There because is projection of an annual income. In consequence in the cubic- mous volume of air contained in the hall, and received light from the lateral windows; the next being placed next the wall and enclosed by the projection of the gallery, he could not be blamed for the ventilation of these cells was inferior; the hall only contained 40 beds, the lateral windows could be opened, and the inferior being very high, ventilated by a holes made in the perpendicular ceiling, one can admit that the conditions of ventilation were good.

To show our readers the arrangement of the cells and gallery- vide Al Conservatoire, Al Chalon Sur Saône, Professeur Vincent the day of the hall.

The windows of the gallery being filled with painted glass, those of the sanctuary are colored glass. A full score of ope-

and the ventilators E with 4 ins. openings. The side windows with tracery are arranged to be opened from the bottom of the springing of the pointed arch, and steps are placed at the s sill permitting one to draw the bolts. This interior exists nearly intact, except the porch, and produces a grand effect. It is one of the most beautiful examples of civil architecture of the end of the 13 th century; nothing less was required than the entire influence of the commission of historical monuments to obtain its preservation from the city of Tonnerre. Why did the city of Tonnerre desire to demolish this edifice? One wo-ould probably have much difficulty to learn. Why did the city of Orleans demolish its old hospital, one of the most beautiful edifices of the Renaissance? How many cities without any ser-ious reason have destroyed monuments that proved their age, t that gave them a particular interest, and that retained stran-gers within their walls? Much regretted a little late were t those acts of vandalism, and men were astonished that travele-rs passed with indifference through the midst of their new streets, not even giving a glance at the columnar facade of the palace of justice, or the facade of the new hospital, eas-ily mistaken for a barrack.

The arrangement of the beds of the hospital of Tonnerre, each placed in a cell with upper service gallery, merits our caref-ul attention. Each invalid, being subject to the oversight so much easier because exercised from the gallery, found himself in possession of an actual chamber. He benefited by the enor-mous volume of air contained in the hall, and received light from the lateral windows; his head being placed next the wall and sheltered by the projection of the gallery, he could not be wearied by the brightness of the light. Perhaps one would object that the ventilation of these cells was imperfect; but the hall only containing 40 beds, the lateral windows could be opened, and the interior being very high, ventilated by h holes made in the carpentry ceiling, one can admit that the conditions of sanitation were good.

To show our readers the arrangement of the cells and galle-ries of supervision, we present (8) a perspective view of one bay of the hall.

The windows of the gallery being filled with grisaille glass, those of the sanctuary had colored glass. A tall spire of car-

[illegible] arrangement that necessary; it was covered by lead gutter and slides, and was only discovered in 1722. The entrance [illegible] wall is [illegible] with [illegible] [illegible] of enameled terra cotta.

By the square stairs built on the porch basils one of the two consoles of the cornice, one recalled the [illegible] hall built over that chapel and formerly serving, as it still does today, for vestiary and sacrives. The tympanum of the principal door opening under the porch next the street was decorated by a relief representing the last judgement, several frescoes of [illegible].

Note 1.p.114. To M. Lefort, architect at Sens, we owe [illegible] measurements and drawings of this great hall of the hospital of Tonnerre. M. Lefort has the courtesy to place all his drawings at our disposal.

All those somewhat interested in our old edifices have visited the charming capital of Yonne, founded in 1442 by Nicolas Rolin, chancellor of the duke of Burgundy. That essentially [illegible] is nearly as old as [illegible] Left it to us, although in good part built of wood. It consists of three buildings [illegible] around a rectangular court. In the building next the street is placed the great hall with its chapel at the end, the porter's lodge and some vaulted rooms intended for servants. The other two buildings, before which [illegible] a gallery in two stories, consists one [illegible] of the [illegible], the kitchen and the pantry. Great large [illegible] are placed and give front in the hall above the external galleries, while the vaulting [illegible] and the [illegible] [illegible] (See Arch. Civ. et Dom. of M. V[illegible] and Dessins. Vol. I). The court of this [illegible] with a pleasant appearance, well proportioned, still [illegible] its well of the 15 th century, its lavatory and [illegible] [illegible] the eyes to fall all at Yonne. The [illegible] the street is preceded by a road of [illegible] covered by [illegible].

[illegible] view of the [illegible] of the court at the principal [illegible] [illegible] the two [illegible]. At A (see plan) is the entrance; at B a [illegible]; at C the [illegible] hall [illegible] [illegible] D, now separated from the hall; at E is the refectory of

carpentry surmounted that sanctuary; it was covered by lead painted and gilded, and was only destroyed in 1793. The entire carpentry of the hall is roofed with glazed tiles and crestings of enameled terra cotta.

By the square stairs built on the north beside one of the two chapels of the chevet, one reached the vaulted hall built over that chapel and formerly serving, as it still does today, for treasury and archives. The tympanum of the principal door opening under the porch next the street was decorated by a relief representing the last judgement, several fragments of w which exist.[1]

Note 1.p.114. To M. Lefort, architect at Sens, we owe minute measurements and drawings of this great hall of the hospital of Tonnerre. M. Lefort had the courtesy to place all his drawings at our disposal.

All those somewhat interested in our old edifices have visited the charming hospital of Beaune, founded in 1443 by Nicolas Rolin, chancellor of the duke of Burgundy. That establishment is nearly as the 15 th century left it to us, although in good part built of wood. It consists of three buildings e erected around a rectangular court. In the building next the street is placed the great hall with its chapel at the end, the porter's lodge and some vaulted rooms intended for provisions. The other two buildings, before which extends a gallery in two stories, contains the notitiate of the sisters, three halls, the kitchen and the pharmacy. Great carpe try gables are glazed and give light in the halls above the external galleries, while the ventilation is made by the same galleries and the opposite sides. (See Arch. civ. et dom. of MM V Verdier and Cattois. Vol. I). The court of this establishment with a pleaseng appearance, well proportioned, still containing its well of the 15 th century, its lavatory and pulpit, almost produces the wish to fall ill at Beaune. The doorway on the street is protected by a hood of carpentry covered by slates. (Art. Auvent).

We give (9) the plan of the hospital of Beaune, and (10) a view of the angle of the court at the principal stairway serving the two stories. At A (see plan) is the entrance; at B a service passage; at C the great ceiled hall [1] with its chapel D, now supported from the hall; at E is the refectory of

the airgaps and the depth of the sleepers; at F the rooms f for servicing; at G the novitiate of the sisters; at H the halls of the sick; at I a passage opening on a garden; at K kitchen, and at L the dormitory: the well is placed at O, the palace at M and the lavatory at P.

Note 1.p.116. A coiling of boards has been placed beneath the roof, and destroys the grand appearance of the hall.

Let us now examine one of those more modest establishments, far from the great centres, near some abbey or some priory, that were so much scattered over France and in the middle ages. Let us enter the infirmary called du Tonnerre, not far from the road that leads from Bonn to Le Mans. We shall find [illegible] Tonnerre. The influence of Tortoir, we believe, reaches from the first half of the 14 to century.[1] The entirety of the essential is constructed in a square and will use three building of that epoch of construction (14). A is the hall of the sick: B is the chapel: C a building of two stories, probably for the infirmers and for the kitchen. The other buildings now existing within the enclosure are of quite recent date. Let us convey ourselves with that hall A. The two ends are closed by two double walls with fireplaces. To the court in the interior of the enclosure opens the wide doorway with arches on the side; on that front are no other openings except two raised windows. Before this wide doorway was suspended a strongly protecting and cool (if we judge by its traces and the interior of the cloisters), that serves to shelter the patients coming the sick. For ordinary use has been contented to use the little door. On the contrary, on the exterior that hall of the sick was crossed by two tiers of wide windows, so arranged that the lower row lighted the wooden cells, similar to those of the convent of Tonnerre, and the upper series opened on [illegible] I (see plan) without a window. At Tonnerre the distance between [illegible] is 12.8 ft.; the same distance between the axes of [illegible] of the hall of Tortoir (see Fig. 12, the angle of [illegible] of those cells to be of the same depth as those of the [illegible] of Tonnerre, and placing seven partitions in the axes of the buttresses, the hall being 92.8 ft. wide, there con-

the sisters and the parlor of the superior; at F the rooms f for provisions; at G the novitiate of the sisters; at H the halls of the sick; at I a passage opening on a garden; at K the kitchen, and at L the pharmacy; the well is placed at O, the pulpit at M and the laundry at P.

Note 1.p.115. A ceiling of boards has been placed beneath the vault and destroys the grand appearance of the hall.

Let us now examine one of those more modest establishments, far from the great centres, near some abbey or some priory, that were so much scattered over French soil in the middle ages. Let us enter the infirmary called du Tortoir, not far from the road that leads from Laon to la Fere. We shall find there the curious internal arrangements of the hospital of Tonnere. The infirmary of Tortoir, we believe, dates from the first half of the 14 th century.[1] The entirety of the establishment is constructed in a square and still has three buildings of that epoch of construction (11). A is the hall of the sick; B is the chapel; C a building of two stories, probably for the religious and for the kitchen. The other buildings now existing within the enclosure are of quite recent date. Let us occupy ourselves with that hall A. Its two ends are closed by two gable walls with fireplaces. To the court in the interior of the enclosure opens the wide doorway with wicket at the side; on that front are no other openings except two raised windows. Before this wide doorway was suspended a strongly p projecting shed roof (if one judges by its traces and the mortises of the carpentry), that served to shelter the carriages bringing the sick. For ordinary use men were contented to use the little door. On the contrary, on the exterior that hall of the sick was pierced by two tiers of wide windows, so arranged that the lower row lighted the wooden cells, similar to those of the hospital of Tonnerre, and the upper series opened on the gallery, to which one ascended by a stairs arranged in bay I (see plan) without a window. At Tonnerre the distance between partitions is 12.8 ft.; the same distance between the axes of buttresses of the hall of Tortoir (see Fig. 12, one angle of the front of the hall on the external side). Assuming the partitions of those cells to be of the same depth as those of the hospital of Tonnerre, and placing seven partitions in the axes of the buttresses, the hall being 32.8 ft. wide, there rem-

remained 19.7 ft., for passage on the gallery side and against the cella (see plan), and one small chapel seven beds in length, the space of the gallery behind the place of the cell. Now this number of seven beds is very frequently adopted in these little provincial sanatoria. If so, small side galleries were secondarily reserved for those kind of contagious diseases, and that minute precautions were taken, not only to separate them from the church, but also to isolate them from each other, as small nets arranged that arrangement of cella with windows, that allowed these poor persons to see the country and to warm themselves in the first rays of the sun, for [illegible] in plans inside, so as to avoid too great heat. A defensive gallery with mosaicsatoria connected the pinacoes and was in communication with the internal gallery by doors placed in the side walls. A dish surrounded the sanatoria, as one can testate by examining the external substructure of the great wall. The reason the beds of the four wards only by the gallery and by lectors placed in these wards serving for refreshment. [illegible] vol. II. p.107.

The truth was the exhorted in the composition of these sanatoriums of benevolence the inferior ward, that one a course to them in the consequence of religious monasteries. Indeed it is a singular peculiarity to be so willing that those monasteries should have been so small, when is considered the erection of churches, and at the same time so clumsy when it referred to the building of civil edifices. It was not their fault, that since the 16 th century have been destroyed most of those benevolent establishments infinitely divided, but generally well arranged otherwise, to replace them by hospitals in which on the contrary, men have scanty, and occupied wretchedly, to concentrate the greatest possible number of the sick. [illegible] in France, dreaded the hospitals erected under his reign by the ministry of [illegible] [illegible], that no longer had a reason for existence, since in his time, there were no lepers to be cured for; but this is not to say that the hospitals of the 17 th century were models to be followed in regard to arrangement, from the point of view of san-

remained 19.7 ft., for passage on the entire side and outside the cells (see plan), and one could place seven beds in them, the stairs of the gallery taking the place of one cell. Now t this number of seven beds is very frequently adopted in these little charitable establishments. If we recall that infirmaries were especially reserved for those ill of contagious diseases, and that minute precautions were taken, not only to s separate them from the people, bu also to isolate them from each other, we shall here understand that arrangement of cells with windows, that allowed these poor persons to see the country and to warm themselves in the first rays of the sun, for these windows opened about East. They were further fitted with blinds inside, so as to avoid too great heat. A defensive gallery with machicolations connected the buildings and was in communication with the internal gallery by doors placed in the gable walls. A ditch surrounded the enclosure, as one can recognize by examining the external substructure of the great hall. One reached the tops of the four turrets only by the gallery and by ladders placed in these turrets serving for watchmen.

Note 1.p.116. See Arch. civ. et dom. of MM. Verdier and Cottois. Vol. II. p.107.

The middle ages then exhibited in the composition of these establishments of benevoleyce the ingenious mind, that one a coords to them in the construction of religious monuments. Indeed it is a singular prejudice to be so willing that those architects should have been so subtile, when it concerned the erection of churches, and at the same time so clumsy when it referred to the building of civil edifices. It was not their fault, that since the 16 th century have been destroyed most of those benevolent establishments infinitely divided, but generally well arranged otherwise, to replace them by hospitals in which on the contrary, men have sought, and perhaps wrongly, to concentrate the greatest possible number of the sick. Louis XIV, the great leveler of all things and all conditions in France, gratified the hospitals erected under his reign by the property of those numerous infirmaries and leper hospitals, that no longer had a reason for existence, since in his time, there were no lepers to be cared for; but this is not to say that the hospitals of the 17 th century were models to pe followed in regard to arrangement, from the point of view of san-

ventilation, heating and the response that should be had for the sick poor. In the few hospitals of the middle ages, that have remained to us, we find a spirit of very advanced and laborious charity. These buildings have a monumental appearance without grandeur; the galleries have space, air and light; they are often separated from each other, as one may move in the presence of vast halls. Then frequently the sufferings of each patient are by the aspect of the suffering of his neighbors. Moreover, strange that the cellular system, frequently adopted in the hospitals of the middle ages, has especially overwhelmed the system adopted in our time. It is certain that from the moral point of view it presented advantages. To address to another that it separates from a sentiment of very noble charity among the numerous founders and conservators of our hospitals of the middle ages.

Before terminating this article, we shall attempt to lighter an error nearly general, concerning the establishment of lazarettos. It has been claimed that Isocrey was brought from the East to the West at the time of the crusades; but as we have stated above, in the time of Vespasian Paris there were 15,000 lazar houses in France, nearly built in conformity with the rules of the East. Further, of 30,000 men left into the East by the brother of Philip I, nearly 5,000 returned Palestine, all very few returned to France. Of the many of crusaders sole to see their native land again. Doria the Genoese and Florent Clemenceau founder alone also from Palestine. Then how could these armies, then were available to in the East, be able to import and distribute leprosy in the West? So that it was necessary to found 15,000 lazar houses

Interest

would not be in close here, concerning the invasion of this disease in Europe and particularly in France, and the [illegible] to it as medicine. That is crossed much before the crusades.

Note 1.p.119. On this subject, see references sur l'orthéin [illegible]

sanitation, hygiene and the respect that should be had for the sick poor. In the few hospitals of the middle ages, that have remained to us, we find a spirit of very extended and delicate charity. Those buildings have a monumental appearance without being rich; the patients have space, air and light; they are often separated from each other, as one may prove in the preceding examples; their individuailty is respected, and certainly if there be anything repugnant to the unfortunate, who find refuge in those establishments, in spite of such enlightened care given them abundantly today, it is the common occupancy of vast halls. Then frequently the sufferings of each patient increase by the sight of the sufferings of his neighbors. Without claiming that the cellular system, frequently applied in the hospitals of the middle ages, was materially preferable to the system adopted in our time, it is certain that from the moral point of view it presented advantages. We adhere to showing that it emanated from a sentiment of very noble charity among the numerous founders and constructors of our hospitals of the middle ages.

Before terminating this Article, we shall attempt to destroy an error widely spread, touching the establishment of leper hospitals. It has been claimed that leprosy was brought from the East to the West at the time of the crusades; but as we have stated above, in the time of Matthew Paris there were 19,000 leper houses in Europe, mostly built in cemeteries having no relation with the East. Further, of 300,000 men led into the East by the brother of Philip I, scarcely 5,000 reached Palestine, and very few returned to Europe. Of the army of the emperor Conrad III, there remained but a small number of crusaders able to see their native land again. Louis the Young and Richard Lionheart returned almost alone from Palestine. Then how could these armies, that were swallowed up in the East, be able to import aud distribute leprosy in the W West, so that it was necessary to found 19,000 leper houses to care for lepers? Without entering into a discussion that w would not be in place here, concerning the invasion of that disease in Europe and particularly in France, one may recognize it as certain, that it existed much before the crusades.[1]

Note 1.p.119. On this subject, see Recherches sur l'origine des lodreries, etc., by L. A. Lobourt. Paris. 1854.

Here is the list of the provincial monastic foundat as Ma-
rie from the 7 to to the 16 on centuries.

Abbey, [illegible] in Saint-[illegible] by [illegible] (Ar-
ch century).

Convent des Augustines, formal order Paris, 1rd d-ora
to in [illegible] 7. [illegible] to be century b
see Tenis of Mercy rebuilt the [illegible].

Convent 4. Cervata, formed by Gaston Besson, prees, in
1171. The chapel of that convent was only restored in 1411.

Convent 5. Dameiche, originally called S. Jocostrne (ac-
ue 1163). The chapel was built in 1222, then rebuilt in 1272.

Monastery of 6. Fraires, Pas S. Pierre, founded by the broth-
ers Fonlcerd in 1272. Was converted converted a very beautiful
hall for the order to place in. In 1210 was added a chapel. The
ruins of the cloor were rediscovered and raised in the estabil-
[illegible]. The monastery was successively enlarged until 1792.

Monastery of Guiche-Tuenia, founded by 5. Tuna in 1254.

[illegible]

Convent of Jacobins, founded in 1272. In 1766, James of
Bourbon, wife of Charles V, enlarged it.

Convent of 9. Jacques-du-Haut-Pas, founded by Philip IV
in 1294.

Convent colonized to the priory of the Chartre (Nance Pere
des Filleses), founded by a [illegible] of Paris, [illegible],
in 1289.

Monastery of 8. Jacques-aux-Pelerins, Pas S. Pierre, founded
1245 by Louis V. The chapel was completed in 1222.

Monastery of 9. Julian-aux-Menestrels, founded by two fiddlers
in 1232. In 1274 the founders entrusted [illegible] hall by the monaste-
ries of several [illegible] houses.

Convent 5. Sacrifice, founded by Philip of Valois in 1222.

Monastery of 9. Ecorre, founded in 1241 for [illegible].

Monastic monastic or of [illegible] of Petit-S. Antoine, fou-
ded in 1282 [illegible] Marles 7.

[illegible]
[illegible] and in [illegible]. Houses or [illegible] for the sick, [illegible]
[illegible] and [illegible].

[illegible]

Here is the list of the principal hsopitals founded at Paris from the 7 th to the 16 th centuries.

Hotel-Dieu, according to tradition founded by S. Landry (7 th century).

Hospital des Haudriettes, founded under Clovis, and where it is claimed that S. Genevieve died. In the 13 th century t the family of Haudry rebuilt the establishment.

Hospital S. Gervais, founded by Gatien Masson, priest, in 1171. The chapel of that hospital was only destroyed in 1411.

Hospital S. Catherine, originally called S. Opportune (about 1180). The chapel was built in 1222, then repaired in 1479.

Hospital of S. Trinite, Rue S. Denis, founded by two brothers Escuacol in 1202. That hospital possessed a very beautiful hall for the poor to sleep in. In 1210 was added a chapel. The children of the poor were collected and raised in the establishment. The hospital was successively enlarged until 1598.

Hospital of Quinze-Vingts, founded to S. Louis in 1254.

Hospital of S. Marcel (primitively of the Oursine), founded by Marguerite of Provence after the death of S. Louis.

Hospital of Jacobins, founded in 1263. In 1366, Jeanne of Bourbon, wife of Charles V, enlarged it.

Hospital of S. Jacques-du-Haut-Pres, founded by Philip IV in 1286.

Hospital belonging to the priory of the Charite (Notre Dame des Billetes), founded by a citizen of Paris, Roger Flamming, in 1269.

Hospital of S. Jacques-aux-Pelerins, Rue S. Denis, founded 1315 by Louis X. The chapel was completed in 1323.

Hospital of S. Julian-aux-Menetriers, founded by two fiddlers in 1330. In 1334 the founders enlarged that hall by the acquisition of several adjacent houses.

Hospital S. Sepulchre, founded by Philip of Valois in 1333.

Hospital of S. Esprit, founded in 1361 for children.

Hospital monastic or of commandery of Petit-S. Antione, founded in 1368 under Charles V.

Besides these establishments there exist in a great number of communes and in parishes, houses or halls for the sick, the poor and pilgrims.

HOTELLERIE. Hotel. Inn. Tavern.

In the Gallo-Roman epoch there existed on the great roads at distances sufficiently small, that the traveler could find a lodging at the end of each day. These inns or taverns were large hotels in which were found both horses, lodging, food and drink. They served as halls for soldiers, and were placed under the supervision of inspectors, "frumentarii or curiosi," who watched over their being properly kept, and who were charged to spy on travelers. Thus the inns became places useful to the secret police of the prefects of the government, and still to have the right of lodging in the houses, it was necessary to obtain a sort of traveling card. Besides the houses served for lodging not only private individuals but military, but the military and imperial officers in it rounds, and for the emperor himself, when he traveled. It was in an inn of the country of the Sabines that Titus caught the fever of which he died a few days later. It was necessary to show his traveling card to locate in the inn, for the aforesaid reason that he could procure relay horses only with posted letters.

After the invasion of the barbarians, this establishment of imperial inns was entirely ruined, as well understood. The German races practiced hospitality extensively. A Frank or a Burgundian did not believe that he could refuse admission to his house to a stranger: thus in traveling during the first centuries of the middle ages, men were accustomed as soon as they arrived to ask hospitality of the first comer they met on his route. If the owner addressed was too poor or with too limited quarters to satisfy them, he accompanied them to a neighbor better provided, and all took their repast together. "No other nation," says Tacitus in speaking of the Germans, "receives companions and guests with more eagerness; to close his house to a person whomever he may be, is a crime." According to his history, some travelers are poor, and after a repast and when provisions are exhausted, he that just received him, introduces another refugee and conducts him there; they enter with one his new house without invitation, and are received with equal kindness; known or unknown, they are treated with the same regard for the right of hospitality." When the exaggeration in the proofs traced by Tacitus, it is however certain that

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In the Gallo-Roman epoch there existed on the great roads inns at distances sufficiently small, that the traveler could find a lodging at the end of each day. Those inns or taverns were large hotels in which were found post horses, lodging, food and drink. They served as halts for soldiers, and were placed under the supervision of inspectors, "frumentarii et curiosii," who watched over their being properly kept, and who were charged to spy on travelers. Thus the inns became places useful to the secret police of the prefects of the government, and still to have the right of lodging in the houses, it was necessary to obtain a sort of traveling card. Besides the houses served for lodging not only private individuals and soldiers, but for magistrates and lenders on their rounds, and for the emperor himself, when he traveled. It was in an inn of the country of the Sabines that Titus caught the fever of which he died a few days later. It was necessary to show his traveling card to lodge in the inn, for the stronger reason that he could procure relay horses only with posting letters.

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the generous conquerors of Gaul regarded hospitality as a duty from which one could not free himself.

[illegible]

[illegible] *the duty, and punished by fine those failing in it. -- The capitularies of Charlemagne command hospitality under the same penalties.*

[illegible] since he mentions some of them. The monastic establishments scattered over the soil of Gaul after the 9 th century exercised hospitality, and in the abbeys or priories of the 11 th and 12 th centuries is always mentioned the house for guests, built near the entrance gate. There no less existed in the 12 th century a prodigious number of inns on the great roads and in the suburbs of the cities, and these inns, less watched than in the time of the Gauls, were the refuges of thieves, assassins, fallen women, gamblers and debauchees. The tale of [illegible] inn, in the midst of women that make him drunk and robbed him of his money. Courtois of Arras is robbed in an inn where all [illegible] well furnished, provided with good beds of soft feathers, with good wine in abundance but often adulterated, poultry and venison; girls were attached to the establishment and served as bait to attract, delay and rob travelers.

In the 13 th century inns and taverns were the refuge of the scum of cities, and the ordinances of the kings remained without effect in these dens of scoundrels. Under Philip August in 1192, and during the regency of queen Blanche of Castile in 1229, terrible brawls occurred between the scholars of the University and the innkeepers of Paris; the provost was imprisoned after the first, and the University dismissed its clerics after the second, on the ground that justice was not rendered to them. In the 14 th century these disorders only increased; most innkeepers being cutthroats and robbers of passers; so much so that in 1315, to take from innkeepers the desire to assassinate strangers that stopped with them, an ordinance was issued in which it was stated, "that the host was [illegible]."[1] [illegible]

the barbarous conquerors of Gaul regarded hospitality as a d duty from which one could not free himself.

Note 1.p.121. Germania. Chapter 21.

Note 2.p.121. The riparian law made hospitality an imperative duty, and punished by fine those failing in it. -- The capitularies of Charlemagne command hospitality under the same penalties.

However, from the time of Gregory of Tours there existed inns, since he mentions some of them. The monastic establishments scattered over the soil of Gaulafter the 9 th century exercised hospitality, and in the abbeys or priories of the 11 th a and 12 th centuries is always mentioned the house for guests, built near the entrance gate. There no less existed in the 12 th century a prodigious number of inns on the great roads and in the suburbs of the cities, and those inns, less watched t than in the time of the empire, were the refuges of thieves, assassins, fallen women, gamblers and debauchees. The tale of the prodigal son always represented him at that epoch in the inn, in the midst of women that made him drunk and robbed him of his money. Courtois of Arras is robbed in an inn where all is offered, that can seduce a young man; for the inns were then well furnished, provided with good beds of soft feathers, with good wine in abundance but often adulterated, poultry and venison; girls were attached to the establishment and served as bait to attract, delay and rob travelers.

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the area of the seale. Teams of Indian laborers managed to operate the forgeries by the aid of Indian figures of Arcots c claimed connection of the importance of the countess of Ma- nado. "That place," says M. Le Sour de Lidcy, "was a little im situated on the bank of the river and beyond the grove. a part of the city been almost deserted." The lavatus been served also as hamess of counterfeiters, as proved by this o passage from Ranart counterfeit.[2] (Old French copy).

Note 1.p.122. Lumiere.

Note 2.p.122. Manuscript of Imperial Library No. 5955 of L [illegible]. Paris 1[illegible].

[illegible] the [illegible] of [illegible].

Indian [illegible] concealed themselves from noise.

Note 3.p.122. Les Voleurs et coquets ou monsieur [illegible], by [illegible] Dibdin [illegible] Paris 1[illegible] [illegible] tiers.

One will understand that these establishments are nothing but houses, generally isolated, having no distinctive mark. Upon a side hand of the doorway.

SQUAD. Indian Delivery.

A closed enclosure of planks; solid to military reconnais- ance. It is a wooden structure built on the back of one-horse or horses, destined to receive the malfactors, overmounting the f loot of the mandary and driving a more extended flanking, a po- position very favorable to the defense. We have explained in [illegible] [illegible] [illegible] [illegible] [illegible] of construction and reality of these galleries; they have been [illegible] importance in the art of [illegible] of places from the il [illegible] as one in to conquerors, that we must enter into [illegible].

There is every reason to believe that in the Indian school of these galleries were in use, for there is mention in the Chra- nicles of Cater, of modern works that were actual defensive galleries. We have given an example in Art. Fosse, Fig. 1. In the ancient work that crowned the ditches of the camp of Saint Denis the Italians, the galleries connecting the tower a [illegible] [illegible] necessary for the infantry to command the foot of the ramparts, to mount the trenches, and to shelter themselves from the co- nnalies covered by the defaulters, that have caused the ccom-

the sign of the eagle, Jeanne of Divion installed herself to prepare the forgeries by the aid of which Robert of Artois c claimed possession of the inheritance of the countess of Mahaut. "That place," says M. Le Roux de Lincy, "was a little inn situated on the bank of the river and beyond the Greve, a part of the city then almost deserted." The taverns then served also as haunts of counterfeiters, as proved by this p passage from Renart contrefait.[2] (Old French poem).

Note 1.p.122. Louriere.

Note 2.p.122. Manuscript of imperial library No. 6985 of L Lancelot. folio 32.

Also in the inns came the fomentors of public disturbances, when they concealed themselves from spies.[3]

Note 3.p.122. See Hotelleries et cabarets au moyen age, by Franc. Michel and Ed. Fournier; Book I. Le livre d'or des metiers.

One will understand that these establishments were nothing but houses, generally isolated, having no distinctive mark than a sign hung at the doorway.

HOURD. Wooden defensive Gallery.

A closed structure of planks; applied to military architecture, it is a wooden structure built at the tops of curtains or towers, destined to receive the defenders, overhanging the f foot of the masonry and giving a more extended flanking, a projection very favorable to the defense. We have explained in Art. Architecture Militaire (Figs. 14, 15, 16, 32). the mode of construction and utility of these galleries; they have such great importance in the art of defense of placer frog the 11 th to the 14 th centuries, that we must enter into descriptions.

There is every reason to believe that in the Roman epoch th these galleries were in use, for there is mention in the Commentaries of Cesar, of wooden works that were actual defensive galleries. We have given an example in Art. Fosse, Fig. 1, In the wooden work that crowned the ditches of the camp of Cesar before the Bellovaes, the gallerise connecting the tower s a are continuous galleries protecting a parapet below.[1] The necessity for the defenders to command the foot of the ramparts, to sweep the trenches, and to shelter themselves from the projectiles thrown by the assailants, must have caused the adopt-

[illegible] of the defensive galleries after the Gallo-Roman occupation. The upper battlements in case of siege could not offer an efficient defence, since in mounting the ramparts or crossbowmen were obliged to show themselves. If the besieger reached even the foot of the walls, it became an entire impossibility for the besieged not only to shoot him but even to see him, without leaning half the body over the battlements. Already at the end of the 11 th and beginning of the 12 centuries, we note at the ends of towers and ramparts holes of defensive galleries pierced at the level of the permanent galleries.[2] Frequently these holes are hooked, so as to permit placing under the overjecting beam a stout rampard to relieve the beam.

Note 1.p.122. De Baye Bellico. Book VIII. Chapter 9.

Note 2.p.122. For example at the castle of Coucesonne, where the holes of the galleries are everywhere preserved.

The machine of the towers and curtains of the castle of Coucesonne (about 1100a are high (5.2 × 5.9 ft.): the holes of the galleries are spaced regularly as permitted by the corps of the towers or the internal arrangements; under their piers are pierced four holes entirely through; two a little below the mid-of the galleries and two at the level of the floor of the gallery. Various [illegible] lacks the arrangements [illegible] a first machicoulis, then a second machicoulis B, secondly overjecting. The workmen passed through the battlement and straddled the second machicoulis B, as indicated in the perspective detail B', and then fixed to the timber E by a pin: a short pole D between the [illegible] like flat theorem, it was easy to set the double posts E, between which were slid the tiroes serving as front protection, and then was placed the roof, which covered the gallery and the inner [illegible] gallery, on to be adjusted the [illegible] from projectiles and as radius. Holes G made between the front timbers allowed men to aim. Thus the crossbow men posted on the galleries could send bolts concerning the many sides and upon scones covered the machicolations I on the seaplanes. From the inner gallery other crossbow men or archers still had [illegible] arrows against the besiegers. Communication between the inner and outer galleries was assured on a level or the

adoption of the defensive galleries after the Gallo-Roman epoch. The upper battlements in case of siege could not offer an efficient defense, since in shooting the archers or crossbow men were obliged to show themselves. If the besieger reached even the foot of the walls, it became an entire impossibility for the besieged not only to shoot him but even to see him, without leaning half the body over the battlements. Already a at the end of the 11 th and beginning of the 12 centuries, we note at the summits of towers and ramparts holes of defensive galleries pierced at the level of the permanent galleries.[2] Frequently these holes are doubled, so as to permit placing under the projecting beam a strut intended to relieve its span.

Note 1.p.123. De Bello Gallico. Book VIII. Chapter 9.

Note 2.p.123. For example at the castle of Carcassonne, where the holes of the galleries are everywhere preserved.

The merlons of the towers and curtains of the castle of Carcassonne (about 1100u are high (5.2 × 5.9 ft.); the holes of the galleries are spaced regularly as permitted by the curve of the towers or the internal arrangements; under their piers are pierced four holes entirely through; two a little below t the sill of the battlements and two at the level of the inner gallery. Through the lower hole the carpenters ran a first timber A, then a second timber B, strongly projecting. The workman passed through the battlement and straddled the second t timber B, as indicated in the perspective detail B′, and then entered the strut C in its gains. The head of this strut was fixed to the timber B by a pin; a short post D between the e ends of the timbers stiffened the entire system. Placing planks flat thereon, it was easy to set the double posts E, between which were slid the timbers serving as front protection, and then was placed the roof, which covered the gallery and the inner permanent gallery, so as to shelter the defenders from projectiles shot at random. Holes G made between the front timbers allowed men to aim. Thus the crossbow men posted on the galleries could send bolts through the many slots and drop stones through the machicolations K on the assailants. F From the inner gallery other crossbow men or archers still had the permanent slots L, through which below the galleries they shot arrows against the besiegers. Communication between the inner and outer galleries was established on a level by the

Bulwarks made sections were sufficiently high to allow a man to pass. The covering was made of strong planks on which were placed large blocks or tiles, and if ordinary precautions were taken, fresh meat, brick moulds, mortar or sand. This covering was also placed on poos of barrels and towers of air strong places intended to suffer a regular siege, the masonry betainment only covering in time of cause not for ordinary protection. Indeed, the coverings were so many doors connecting one tower and another galleries at a great number of points; and if the gallery was pierced or destroyed by accumulation of the defenses, there remained sufficient the masonry protection, offering a last shelter to the soldiers that man-ned the rampart.

This move of soldiers was usually placed permanently, but only in time of war. In time of peace, this carpentry was usually removed and placed under cover in the towers and in the numerous recesses created along inside the ramparts. This to facilitate setting and to avoid non crime the climate, clasa-sifying and keeping them, the moles of the galleries were oxer-ced as social circumstances, except in certain exceptional cases, so that all the processed climbs forming the exterior being out to lengths allowed anywhere between one cubic cases and at the ends of the particleves. This one observing how the climbs of the galleries could be rapidly assembled. Indeed, the mobile iron cubes being and (?), whose section is tuscan as A, the carpenter only had to slide between them the projecti-ng planks, as seen at ?. If spaces of great volume, broken by the machines of the passage, broke some planks, they could even be promptly replaced from the inside galleries during the night, without requiring other nails or pins.

Still sometimes the galleries were permanent, particularly at the base of towers; then the galleries were of masonry like

[illegible]

exists in the middle of level a tower of the 12 on century. that has received an upper gallery, whose construction seems to date back to the 12 on century. This gallery forms a part of the roof and is covered with it (?). It is a remarkful work of carpentry executed in fine oak wood. According to the custom of that epoch, each rafter is surmounted an trusses, resting on pieces A (see section C), which rest on

battlements whose merlons were sufficiently high to allow a man to pass. The covering was made of strong planks on which were placed large slates or tiles, and if incendiary projectiles were feared, fresh hides, thick woolen fabrics, manure or turf. This covering was also placed on tops of curtains and towers of all strong places intended to suffer a regular siege, the masonry battlement only serving in time of peace and for ordinary protection. Indeed, the openings were so many doors connecting the outer and inner galleries at a great number of points; and if the gallery was burned or destroyed by stone-throwers of the besieger, there remained standing the masonry protection, offering a last shelter to the soldiers that manned the ramparts.

This sort of galleries was not usually placed permanently, but only in time of war. In time of peace, this carpentry was easily removed and placed under cover in the towers and in the numerous recesses arranged along inside the ramparts. Thus to facilitate setting and to avoid num ering the timbers, classifying and seeking them, the holes of the galleries were pierced at equal distances, except in certain exceptional cases, so that all the protecting planks forming the exterior being cut to lengths slipped anywhere between the double posts set at the ends of the cantilevers. Thus one understands how the placing of the galleries could be rapidly executed. Indeed, the double front posts being set (2), whose section is traced at A, the carpenter only had to slide between them the protecting planks, as seen at B. If stones of great volume, thrown by the machines of the besieger, broke some planks, they could even be promptly replaced from the inside galleries during t the night, without requiring either nails or pins.

Still sometimes the galleries were permanent, particularly at the tops of towers; then the galleries were of masonry like half timber work, or they were covered by slater. There still exists in the castle of Laval a tower of the 12 th century, that has retained an upper gallery, whose construction seems to date back to the 13 th century. This gallery forms a part of the roof and is combined with it (3). It is a beautiful work of carpentry executed in fine and strong oak. According to the custom of that epoch, each rafter is strengthened and trussed, resting on blocks A (see section C), which rest on

the heads of the front posts D received a plate 3 and supported by double ionic inverted brackets 4. These stones relieve these rafters at about the first third of their length. Under each front post of each roof is placed a timber P, that forms a cantilever and manicolaision. At G is seen the front elevation of the gallery, which is boarded and covered by slates in like the roof itself. At occasio diagrams small openings are provided in the gallery to allow ventilation. The lower radial timbers are held in place by dowels as in all carpentry of ionical roofs. The small region soon to undergo permanent pallisades, very common in military structures of the 15 to century, that are not covered by manicolaisions with protection parts of our zones.

During the 14 to century men started fortified the system of wooden palisades at the zone of the ramparts. The double poles were connected, and they were connected with a single row of large square poles (about 11.5 ins. square) placed at the level of the inner galleries; and tacked on oak timber 11.5 ins. square one supports an entrance ramport, even if it overhanged 0.5 ft. Now the galleries rarely projected over 6.4 ft. It is unnecessary to analyze here on these simple galleries, whose construction has been sufficiently indicated in Art. Aquitecture Militaire, Pls. 22. Sus otros in the 14 to century there there is a question of double galleries, [illegible] Filibiche Ja la crosiade contra los Albiscios.[1]

Note 1.p.120. See coll. des docum. ined. sur l'hist. de France. [illegible]

[illegible] Galiana, [illegible] [illegible]

constantly increased one galleries of one only. (Old French [illegible]

Note 2.p.122. Verse 2954 et seq.

Then at the sieges of Beaucaire. (Old French [illegible]). [2]

Note 3.p.122. Verse 2955 et seq.

We have been consulted to seek in our monuments these two types the traces of these galleries in two sources. For at the city of Carcassonne at both sides of each Narbonne, those construction dates back to the reign of Philip the Fair, we have been able to reconstruct the arrangement of one of these double galleries, indicated by the construction of very simple merlons and also a beaker near the upper gallery as indicated by section A. Their base is placed at the level of the inner tall-

the heads of the front posts D receiving a plate S and supported by great double internal braces E. These struts relieve these rafters at about the first third of their length. Under each front post of each strut is placed a timber P, that forms a cantilever and machicolation. At G is seen the front system of the gallery, which is boarded and covered by slates li like the roof itself. At certain distances small openings are pierced in the gallery to allow shooting. The lower radial t timbers are held in place by tiebeams as in all carpentry of conical roofs. We shall return soon to these permanent galleries, very common in military structures of the 15 th century, that are not crowned by machicolations with protecting parapets of cut stone.

During the 13 th century men again simplified the system of wooden galleries at the tops of the ramparts. The double holes were renounced, and they were contented with a single row of large square holes (about 11.8 ins. square) pierced at the l level of the inner galleries; and indeed an oak timber 11.8 ins. square can support an enormous weight, even if it overhangs 9.8 ft. Now the galleries rarely projected over 6.4 ft. It is unnecessary to enlarge here on these simple galleries, whose construction has been sufficiently indicated in Art. Architectura Militaire, Fig. 22. But often in the 13 th century there is a question of double galleries, notably in the Histoire de la croisade contre les Albigeois.[1]

Note 1.p.128. See Coll. des docum. ined. sur l'hist. de France. I series, etc. Translated by M.C.F.uriel. 1837.

At Toulouse, besieged by simon de Montfort, the inhabitants constantly increased the defenses of the city. (Old French poem).[2]

Note 2.p.128. Verse 6854 et seq.

Then at the siege of Beaucaire. (Old French poem). [3]

Note 3.p.128. Verse 3988 et seq.

We have been compelled to seek on the monuments themselves the traces of those galleries in two stories. Now at the city of Carcassonne at both sides of gate Narbonne, whose construction dates back to the reign of Philip the Bold, we have been able to recognize the arrangement of one of these double galleries, indicated by the construction of very strong merlons cut with a batter next the inner gallery as indicated by section A. Their base is pierced at the level of the inner galle-

gallery by holes 11.8 ins. square and regularly spaced for the gallery. On the surface of the inner gallery of the city is a continuous recess B. The double galleries were then arranged thus; every 5 ft. there passed through the holes for the galleries a strong beam C, on the outer end of which stood the inclined post D with a duplex post E forming the slot for passage of the protecting planks. Double timbers J held these posts, rested on the plate E, gripped the three posts G, H, I, G resting on the inclined surface of the merlon, and came to hold the inclined rear post K. A second row of ties placed at L at 5.9 ft. from the first row formed the tiebeams of the p principals M of the roof. At N a slot was left along the external surface of the curtain. This machicolation was served by men placed at O in the inner gallery at each space fitted with an opening P. The archers and crossbow men of the lower gallery were posted at R, and did not have to attend to serving this first machicolation. The second gallery had a machicolation at S. The store of projectiles was made within the c city by a hoist T. Stairs Q were placed at certain distances and connected the two galleries. In that manner it was possible to pile a considerable quantity of stones at V without o obstructing passage in the permanent galleries or the crossbow men. At X one sees the external elevation of the carpentry of the gallery without its protecting planks, and at Y that carpentry is covered. Through the slots of the machicolations could be cast on the assailants a prodigious number of projectiles. As always, the permanent slots U pierced in the merlons opened under the gallery, and permitted a second row of crossbow men posted between the trusses on the permanent gallery to aim at the enemy. One conceives that the inclination of t the protecting planks was very favorable to the shooting. It further allowed making a second machicolation S overhanging the lower gallery. The expense required by such considerable carpentry scarcely permitted it to be established only in exceptional circumstances, at points poorly defended by nature, and that was precisely the case at both sides of gate Narbonne, particularly for the north curtain (Art. Porte), on the extent between that gate and the tower du Tresau to which this system was applied.

If curtains were equipped with galleries, for a still stron-

accounter reason the cons of the towers should be furnished a with that necessary informs, since there was more advantage in avoiding a tower than a curtain; as the towers of the army of Jerusalem are all placed at the level of their upper floors by very wide openings on galleries, well arranged and distributed around the circumference. But these towers being covered by corbelling, it was impossible to arrange them so that the could out on the north of the galleries without injuring those of the towers. For that purpose was left above the central vacant space between the cloche to insert the corbels of the gallery (G), that were laid on the plane of the roof and fastened behind the fencing by keys, as indicated by the section A. The gallery of the round tower than formed a polycentral plan with more or less sides, according to the circumference of the tower was larger or smaller, for the openings of the gallery, like the basilicas and aisles, are always pierced at equal [illegible]. [illegible] according to the locality and occasion, and because why; the bases of the towers (like those of the curtains) were built [illegible] the level of the commencement of the fitton. If the assailant succeeded in filling the fitton, he reached the top of the battar at G, as indicated by the axesen V. Then the mantelpiecar one pierced at C did not strike vertically the dinens at G; it was then necessary to have a mantelpiecar at B along the antifoc of the tower. On the contrary, if a miner attacked the base of the tower at F in the bottom of the fitton, it was necessary to open a mantelpiecar at C directly over him. For the possibilities falling from the mantelpiecar B planed on the side and must demorce a parapet a b over the heads of the miners. But if the assailants appeared in mass at the base of a tower or curtain, protected by a rolling shed or cat, the projectile falling vertically from the mantelpiecar B c caused more damage by bouncing, for it could this enter behind the [illegible] tower at the end of the 12 to century, forming a part of the [illegible] of the boundary protection on all projecting parts of the

stronger reason the tops of the towers should be furnished w with that necessary defense, since there was more advantage in attacking a tower than a curtain; so the towersof the city of Carcassonne are all pierced at the level of their upper floors by very wide openings on galleries, well arranged and distributed around the circumference. But these towers being covered by carpentry, it was indispensable to arrange them so that one could put on the roofs of the galleries without injuring those of the towers. For that purpose was left above the cornice a vacant space between the blocks to insert the rafters of the gallery (5), that were laid on the plate of the roof and fastened behind the framing by keys, as indicated by the section A. The gallery of the round tower then formed a polygonal plan with more or less sides, according as the circumference of the tower was larger or smaller, for the openings of the gallery, like the battlements and slots, are always pierced at equal distances. The continuous machicolations were opened along the surface of the tower, at B along the protecting planks, at C according to the locality and occasion, and because why?; the bases of the towers (like those of the curtains) were built battering with rare exceptions. The batter usually ended at the level of the counterscarp of the ditch. If the assailant succeeded in filling the ditch, he reached the top of the batter at G, as indicated by the sketch M. Then the machicolations pierced at C did not strike vertically the miners at G; it was then necessary to have a machicolation at B along the surface of the tower. On the contrary, if a miner attacked the base of the tower at F in the bottom of the ditch, it was necessary to open a machicolation at C directly over him, for the probectiles falling from the machicolation B bounced on the slop and must describe a parabola a b ower the heads of the miners. But if the assailants appeared in mass at the base of a tower or curtain, protected by a rolling shed or cat, the projectile falling vertically from the machicolation B c caused more damage by bouncing, for it could thus enter beneath the cat. At P we give a perspective view of the top of the tower at the end of the 13 th century, forming a part of the walls of the city of Carcassonne, with its galleries placed and partly covered by fresh hides, so as to avoid the effect of the incendiary projectiles on all projecting parts of the

galleries.

gallery.

But from the first half of the 13 th century, men had already sought to prepare, at least in part, for the danger of fire presented by those projecting galleries placed on cantilever beams, and against which the assailants cast a number of little kegs of Greek fire, and darts wrapped with tow, resin or burning bitumen, all materials that by their nature could stick to the carpentry, and produce a very lively fire, that water could not extinguish. We already see at the tops of the towers erected at Coucy by Enguerrand III from 1220 to 1230 stone corbels, intended for placing the wooden galleries. The combination of these galleries is very apparent and very ingenious at the top of the keep of Coucy (Art. Donjon, Fig. 39). The bottom of the galleries of that celebrated keep, the largest of all those in Europe, is 131.2 ft. above the counterscarp of the ditch. And although at that height the besieged did not have to fear incendiary projectiles, they established around the entire exterior of the enormous cylinder 48 stone corbels projecting 3.2 ft. and 1.0 ft. thick, to receive the gallery whose section is given at A in Fig. 6. At B is seen one of the corbels, each composed of two courses. On these corbels in time of war rested a sill C receiving two inclined posts D, E. Doubled beams F were placed a little above the level of the opening in the battlements, and served to bear a floor intended for crossbow men. Before this floor was opened a machicolation G vertically over the base of the batter of the keep at the bottom of the ditch. According to the system before explained, protecting planks were placed in the slot between t the posts P, doubled by a post held at its base by the horizontal timbers. At the top of the cornice H is built a double slope of stone on which rest both series of rafters H′, whose slipping was prevented by the angle at J. On the continuous i internal corbel K being set other inclined posts L, held by double timbers M and tenoned into the rafters I′. On the beams M, timbers receive the floor O, which at each opening rests on the wall, but so as to leave between this floor and that of the gallery the machicolation N vertically over the outside of the tower. The floor O is placed in communication with the terrace by some stairs P, and allows one to reach the floor of the gallery, and to post a second row of crossbow men, who

can shoot through the slots in the masonry. (See the interior face T, which represents at M the plain battlements and at M' the battlements with galleries). The angle of fire is carefully arranged to cover with projectiles the defensive gallery of the curtain of the keep. The machicolations amply suffice to reach the bottom of the moat drawn, excavated between the curtain and the tower. The defenders may be posted on the gallery or in the interior, being thus perfectly covered. Stones piled in the embrasures of the casemates on the floor O can be pushed off with the foot, and so rapidly dropped through the machicolation V. At S are placed the doors o casing outside the water from the terrace; these doors were formerly lined with lead. Like the terrace itself. A fragment of the plan of the top of the keep of Coucy with the galleries as assumed to be put off at the level a b (7) completes the explanation of Fig. 6.

By some [illegible] in remains of the original [illegible] these galleries at the height of 151 f. above the bottom of the drawn, on isolated corbels below the battlements. Having to place a machicoli at the [illegible] of these corbels, to place two iron circles and to repair the crown heavily cracked by the explosion in 1692, we naturally had to seek for the architectural means employed in the 12 th century to assemble the galleries. Now all is freshen and colorized in this remarkable crown of the keep to facilitate here lower successly as lanterns, and we have been led by the arrangement of the masonry itself, the holes and voids, to study the processes employed by the carpenters of the 12 th century, by the reason that they could not use cornice. One results (Arc. Dorion, Plas. 35, 39) how is drawn the platform of the keep of Coucy. Just platform consists of a wide inner defensive gallery circling a vault with 12 sides covered with lead and forming a big roof, at the centre of which is placed a round opening. [illegible]

Once the rainwater outside, could be easily leveled by means of open lead on blocks. These tiroes (Fig. 5) in two rows A and B formed two wooden rails on which was set a crane with wheels A, larger than those at S, allowing it to move in a circle. The sad C of that crane passed beyond the outside vertical of the great corbels D. Since on the side of that cor-

can shoot through the slots in the masonry. (See the internal face T, which represents at T′ the plain battlements and at T″ the battlements wit galleries). The angle of fire is particularly arranged to cover with projectiles the defensive gallery of the curtain of the keep. The machicolations amply suffice to reach the bottom of the paved ditch, excavated between the curtain and the tower. The defenders may be posted on the gallery or in the interior, being thus perfectly covered. Stones piled in the embrasures of the batteries on the floor O can be pushed off with the foot, and be rapidly dropped through the machicolation N. At S are pierced the ducts c casting outside the water from the terrace; these ducts were formerly lined with lead, like the terrace itself. A fragment of the plan of the top of the keep of Coucy with the galleries assumed to be cut off at the level a b (7) completes the explanation of Fig. 6.

We have endeavored to render an account of the manner of setting these galleries at the height of 151 ft. above the bottom of the ditch, on isolated corbels below the battlements. H Having to place a scaffold at the height of these corbels, to place two iron circles and to repair the crown deeply cracked by the explosion in 1652, we naturally had to seek for the practical means employed in the 13 th century to assemble the galleries. Now all is foreseen and calculated in this remarkable crown of the keep to facilitate that labor apparently so dangerous, and we have been led by the arrangement of the masonry itself, the solids and voids, to apply the procedures employed by the carpenters of the 13 th century, by the reason that they could not use others. One recalls (Art. Donjon, Figs. 38, 39) how is drawn the platform of the keep of Coucy. That platform consists of a wide inner defensive gallery encircling a vault with 12 sides covered with lead and forming a hip roof, at the centre of which is pierced a round opening. This internal gallery, divided in slopes and counter slopes to throw the rainwater outside, could be easily leveled by means of beams laid on blocks. These timbers (Fig. 8) in two rows A and B formed two wooden rails on which was set a crane with wheels A, larger than those at B, allowing it to move in a circle. The end C of that crane passed beyond the outside vertical of the great cornice D. Since on the ridge of that cor-

[illegible] the fact circumstances 2, it was necessary for the base of the stage to be raised so as to give over head clearance. This was done by arcing on a pin 3, and the operant back to its normal position by first at the rear and by the beam 4 and a bolt 1. Detail K represents that cause in elevation on the minimum arc. But it was necessary that the counterweights on the extreme ends assembly the stages supported by that crane and allow them to the centers of the balconies. An overhanging mechanism is indicated in section at 6 and in elevation at 1', although the first stage M before was operated and at the level of the gallery, and a second stage V below, so as to be able to set the blocks on the corbels and to assemble the instrument in these blocks. Workmen overhanging the top of the rigs of the counterweight easily re-made the railing together and measure the place of sets there. This tremble the kept the [illegible] operation of placing the gallery could be done in brief time and without requiring scaffolds other than those light overhanging stages placed circles even opening, so other mechanisms than that cranes, moving in a circle by means of its wheels of different diameters. The cantilever stage I was only built for an opening and was successively, transferred by the [illegible] the centrals of the rotation concentrated to the diameter of the circle, so that the [illegible] arcs above their surface; 2, that the zones of these openings are portion so that the two overhanging beams can be properly set on the wall V; 3, that by means of the two pieces 3,3, the [illegible] have not full clearance; 4, that the blocks of the great corbels, whose material could not be anything, and a perfect moving in the rotation of the rafters, that firmly rested on their surfaces; 5, both the strong inserted and external projection of the corbels by so much relieved these rafters; finally a [illegible] was not necessary as first sight in such colossal construction, having moved by the pressure of the cantilevers and a [illegible], it encountered so one moment then the stability the connection of the pillars and the role of securing them. But even in this architecture of the middle ages; it is necessary to keep carefully the exclusion of all its forms, for essentially in military attitudes they necessarily are a reason of ex-

cornice rose four pinnacles P, it was necessary for the beam of the crane to be raised to pass over these pinnacles. That beam then swung on a pin G, and was brought back to its inclination and fixed at the rear end by the beam F and a bolt I. Detail K presents that crane in elevation on the windlass side. But it was necessary that the carpenters on the exterior could assemble the timbers supported by that crane and taken through the openings of the battlements. An overhanging scaffold is indicated in section at L and in elevation at L′, allowing the first stage M before each opening and at the level of the gallery, and a second stage N below, so as to be able to set the blocks on the corbels and to assemble the inclined posts in these blocks. Workman straddling the top of the ridge of the cornice could easily assemble the rafters together and arrange the plane of each truss. Thus inside the keep the entire operation of placing the gallery could be done in brief time and without requiring scaffolds other than those little overhanging stages placed outside each opening, no other machines than that crane, moving in a circle by means of its wheels of different diameters. The cantilever stage I was only b built for on opening and was successively transferred by the crane itself.[1] On examining this Fig. with care, one sees:- 1, that the openings of the battlements correspond to the distances of the corbels, so that the double timbers O can just p pass along their surfaces; 2, that the arches of these openings are pointed so that the two overhanging beams can be properly set on the wall V; 3, that by means of the two girts R,R, inclined struts S and J, the overhanging beams M could neither move nor fall outward; 4, that the slopes of the great cornice, whose utility could not be explained, had a perfect motive in the inclination of the rafters, that freely rested on their surfaces; 5, that the strong internal and external projection of this cornice by so much relieved these rafters; finally t that what was irregular at first sight in that colossal crowning, nowise motived by the presence of the battlements and s slots, is explained at the moment when one studies the combination of the galleries and the mode of settiug them. But such is that architecture of the middle ages; it is necessary to seek constantly the explanation of all its forms, for especially in military edifices they necessarily have a reason of ex-

existence and utility; and that contributes to the impressive effect of those vast structures.

Note 1.p.186. This procedure was employed by us in the restoration without having to lament the smallest accident. Three workmen were killed during the repairing of the cracks, but because of negligence in the work. Further, this misfortune occurred outside the stages mentioned, and on which were piled heavy stones, iron bars and timbers of considerable weight.

Fig. 9 gives in perspective the methods of the carpenters p placing the galleries of the keep of Coucy. They commenced by the little overhanging stages at the openings, perfectly sufficing to assemble this carpentry, truss by truss; for those being set a passage was thereby established to the outside to spike the planks of the gallery and the timbers of the roof. It certainly must be admitted that the carpenters of that epoch were very skilful in raising, and it further suffices to convince one's self of this, to see the carpentry erected by them; but the practical means employed here are so well explained by the arrangement of the places, and those means are so safe with little danger, compared with what we see daily, that the building of the gallery of the keep of Coucy could present no serious difficulty.[1]

Note 1.p.187. We repeat this; the absolutely similar operation by the same means was executed in very little time with light timbers by four carpenters, directed by M. Le France, an old skilful journeyman; these are not hypotheses.

There were no less necessary in order to provide a fortification with its galleries, workmen, timber in abundance, and still one risked the burning of those external galleries by the enemy; hence about the beginniug of the 14 th century the carpentry galleries were generally renounced in France, to r replace them by machicolations with a protecting wall of stone. (Arts. Architecture Militaire, Figs. 33, 34, 36, 37, 38; Machicoulis). Only in the provinces of the East did military architects continue to employ galleries. There are yet seen a great number of them in Switzerland and Germany, that date from the 14 th, 15 th and 16 th centuries; but those galleries are usually placed on the tops of walls, and are no longer combined with the battlementr like those of the 12 th and 13 th centuries.

For example, here is a gallery placed on the portal of a tower of the 12 th century at Qadev near Verdun. It is well preserved but this gallery is of a later date (13), as shown by the 14 th century. It consists of half timber work colled - ed and on frame and covered by vertical planks nailed on the top of lower girts giving frets. The whole is covered by a roof.[2] Many towers in the archpots of Verdun are still equipped with these galleries built during the wars of the 14 th and 15 th centuries, and which have been since left in place, and serve as belfries.

Note 2.p.127. The covering of this tower was communicated to us by M. Pattico-Ballpere of Verdun.

As Commerce in Switzerland is small when a certain number of towns equipped with galleries, that date from the 15 th century. The question arose of that city dates from 1295, and a one remained on its upper part a part full gallery of the ex - ne epoch, and which is present in Zurich (11). These galler - ies commune with the carpentry of the roof and occupy the top of the wall at two sides of the building facing the nave. (A (Arc. Prescone, Fig. 2). The system A shows a system of enclo - sure by vertical planks on the exterior, and system B is the repair of the lower setting of these fir planks of constructe - ore brackets with their bayonets C. As always, a continuous construction is left at D.

Van still built galleries c reated artillery; but even took the precaution to replace the planks by masonry galleries be - ween the meters. Galleries of this sort still exist in Cor - rano and Sirzerfeni, mostly on the lower that terminates the bridge of Commerce at the city end. At Vercorcq still a exist galleries of the 16 th century on the remparts built by Alcere Tuger (Arc. Prescon, Fig. 12). These galleries are c of masonry covered the corbels and crown the casemes of the curtains above the green artillery.

The name of gallery is also given to coefficile built in mills, either on one of the free sides to allow persons of distinction to see certain ceremonies, bailiffs or combats in the enclo - sed space. These galleries were then otherwise, i.e., covered by rich tapestries, which is of some, painting on linen and t tapestries. Their interiors were arranged in rooms and nowad - ays divided into boxes by clean partitions. The ceremonies

For example, here is a gallery placed on the summit of a tower of the 12 th century at Dugny near Verdun. It is well understood that this gallery is of a later date (10), we think of the 14 th century. It consists of half timber work corbelled out on beams and covered by vertical planks spiked on the top of lower girts of the frame. The whole is covered by a r roof.[2] Many towers in the suburbs of Verdun are still equipped with those galleries built during the wars of the 14 th and 15 th centuries, and which have been since left in place, and serve as belfries.

Note 2.p.187. The drawing of this tower was communicated to us by M. Petitot-Bellovene of Verdun.

At Constance in Switzerland is still seen a certain number of towers equipped with galleries, that date from the 15 th century. The custom house of that city dates from 1398, and h has retained on its upper part a beautiful gallery of the same epoch, and which we present in section (11). These galleries combine with the carpentry of the roof and crown the tops of the wall at two sides of the building facing the quay. (A (Art. Breteche, Fig. 3). The sketch A shows a system of enclosure by vertical planks on the exterior, and sketch B is the detail of the lower cutting of these fir planks of considerable thickness with their battens C. As always, a continuous m machicolation is left at D.

Men still built galleries to resist artillery; but then took the precaution to replace the planks by masonry galleries between the members. Galleries of this sort still exist in Lorraine and Switzerland, notably on the tower that terminates the bridge of Constance at the city end. At Nuremberg still e exist galleries of the 16 th century on the ramparts built by Albert Durer (Art. Grenan, Fig. 18). Those galleries are o of masonry between the members and crown the parapets of the curtains above the great artillery.

The name of gallery is also given to scaffolds built in halls, either on one of the free sides to allow persons of distinction to see certain ceremonies, ballets or combats in the enclosed space. Those galleries were then curtained, i.e., covered by rich tapestries, shields of arms, paintings on linen and t tapestries. Their interiors were arranged in steps and sometimes divided into boxes by cloth partitions. The manuscripts

of the 15 to century have discovered in an a great number of t
those designed additions, erected on the occasion of a cour-
ney, dangers or festival.

[illegible]. A series of galleries.

[illegible]. Vicinity of order or disaster causes the manner
of self [illegible] [illegible].

[illegible]. An old word employed to designate the loaf of a [illegible]
the single dressing part of isolated joinery. (Arts. Tours, [illegible]
[illegible]).

[illegible]. A cast of inclined joinery fitting a partition-
or or [illegible].

[illegible]. [illegible].

This word was applied in the middle ages to every [illegible]-
ation of series carved on stone or wood. Sculptors of figures
made the [illegible] of image-makers after the 12 to century. (Art.
Tourneaire).

[illegible]. [illegible].

Employed today to designate a [illegible] joinery of [illegible].
Country dwellers vary in the arrangement of small cut [illegible]
or of [illegible]. Marbles are sometimes composed of [illegible] of air-
[illegible] colors as in Jaunaye and certain [illegible] of the [illegible]-
[illegible]; [illegible] of [illegible] colors as in the [illegible] of the [illegible]
of Tuy; [illegible] of various colors or [illegible]. Marble obtained
by means of [illegible] are so as to [illegible] [illegible] are common
during the 11 to and 12 to centuries. They are very [illegible] to
found in [illegible] of the 13 to century. The [illegible] making a
[illegible] of [illegible] of varied colors are [illegible] found in [illegible]-
es and [illegible] of the 15 to and 16 to centuries.(Art. [illegible]).

[illegible]. [illegible].

This word in [illegible] of the middle ages in France and
[illegible] [illegible] [illegible] [illegible] [illegible]
[illegible], on the [illegible], on [illegible], [illegible] [illegible].
[illegible] in [illegible] [illegible] [illegible] of [illegible], on [illegible] in [illegible].

of the 15 th century have preserved to us a great number of t those decorated scaffolds, erected on the occasion of a tourney, banquet or festival.

HOURDAGE. A series of galleries.

HOURDIS. Masonry of brick or plaster between the members of half timber work.

HUIS. An old word employed to designate the leaf of a door; the entire opening part of isolated joinery. (Arts. Porte, Vantail).

HUISSERIE. A part of isolated joinery forming a partition or barrier.

IMAGERIE. Sculpture. Carving.
This word was applied in the middle ages to every representation of scenes carved on stone or wood. Sculptors of figures had the name of image-makers after the 13 th century. (Art. Statuaire).

IMBRICATION. Coarse Mosaic.
Employed today to designate a delicate jointing of surfaces, forming designs varied in the arrangement of small cut stones or of bricks. Mosaics are sometimes composed of stones of different colors as in Auvergne and certain provinces of the South; stoves of terra cotta as in the cloister of the cathedral of Puy; bricks of various colors or glazed. Mosaics obtained by means of stones set so as to decorate surfaces are common during the 11 th and 12 th centuries. They are very rarely fo found in edifices of the 13 th century. The coarse mosaics m made of bricks of varied colors are especially found in houses and castles of the 15 th and 16 th centuries.(Art. Appareil).

INCRUSTATION. Inlay.
This word in the architecture of the middle ages in France can only be applied to fillings of lead or cement in sinkings in hard stone, as for example, in pavements, tombstones (Art. Dallage). In France this sort of inlay, so common in Italy, h

has not been employed, and that consists in inserting cut pieces of colored marble in recesses sunk in slabs of white marble. Inlays of this kind are seen in the little church of S. Miniato near Florence, made to ornament the pavement, and enclosure of the ambos of the sanctuary, and even the facade (13 th century). The cathedral of Siena, that of Florence (S. Marie des Fleurs), that of Genoa, are externally covered by marble inlays.

INTRADOS. Intrados.

The internal surface of an arch or vault. (Art. Extrados).

JAMBAGE. Jambs.

Name given to the two vertical sides of an opening, door or window, when that opening is terminated by a lintel. When the opening is terminated by an arch, by preference is given to t the two sides that support the arch the name of "pied droits." (jambs). A A (1) are the jambs of the opening B.(Art. Porte).

JAMBETTE. Strut. Furring.

A carpentry term and usually designates a slightly inclined small timber that relieves the foot of the principal of a truss or rafter and is tenoned into the tiebeam or block. A (1) is a strut. (Art. Charpente).

JARDIN. Garden.

In market towns and even the cities (principally those of the provinces of the North), many houses possessed gardens. Gardens are mentioned in a great number of documents of the 12 th and 13 th centuries; and frequently behind those houses, whose facades look on narrow and muddy streets are little gardens.

Love of gardens and of flowers has always been very strong among the peoples of the north of France, and the tales and romances are full of descriptions of those private walks. For castles the garden was a necessary annex; it always consisted of a lawn of turf with a fountain, when that was possible, arbors and vines, beds of flowers, chiefly of roses, much prized in the middle ages, an orchard and kitchen garden. If one could have some area of water, swans and fishes were placed in it. Peacocks animated the lawns and aviaries were one of

resorts of ladies. The stewards of Charlemagne must feed peacocks on the domains;[2] a list of plants for ornamenting gardens is even given at length.[3] There are found lilies, roses and a quantity of culinary plants; apple, plum, chestnut, service, medlar, pear, peach, hazel, almond, mulberry, laurel, pine, fig, walnut and cherry trees.

Note 1.p.143. De ornotu mundi, poem of Hildebert.

Note 2.p.143. Copitulbrio, edih. of Boluze. Vol. I.chop.337.

Note 3.p.143. Chopters 341, 342.

In the Parisian Manager [4] are mentioned all culinary and ornamental plants, that should be cultivated in gardens. Therein are found beans, marjoram, violet, sage, lavender, mint, parsnip, sorrel, leek, vine, cabbage, spinach, rasberry, houseleek, fennel, basil, lettuce, pumpkin, porage, cauliflower, broccoli, hyssop, peony, lily, rose, currant, pea, cherry, or prune, etc. The author does not content himself by giving a simple list of names, but he indicates the mode of planting, sowing, cultivating, smoking and grafting those plants; the methods employed for destroying ants, caterpillars, to preserve fruits, vegetables and even flowers in winter. In the country the gardens were enclosed by hedges or palings, sometimes by walls; in the 15 th century the alleys were already bordered by box. The plans of these gardens much resembled those plans that we see reproduced in the works of Du Cerceau,[5] i.e., they were only composed of flower beds separated by alleys and of great rectangular lawns enclosed by trees and trellises affording shade.

Note 4.p.143. Coposed about 1393 by a citizen of Paris. Published by the Society of Bibliophiles francois. Vol. II, pa 48 et seq.

Note 5.p.143. Des plus excellens bastimens de France.

The abbeys possessed magnificent gardens with orchards, which were frequently for those religious establishments a source of considerable produce. The monks caused the execution of important works to bring water and to distribute it by means of little channels of masonry or of wood. One monastery was famous for its apples or pears, another for its grapes or prunes; and it is well understood, the religious did everything to preserve the reputation that increased their wealth.

Jesse, 1726-32. Three of Jesse.

Genealogy of Christ. In the chapel of S. Gaudens it is said, that Jesse was the ancestor of David the King, and that from this King to Jesse Christ was 24 generations. Yet in many of our religious monuments the genealogy of Christ is represented as commencing with Jesse, from whom grows the trunk of a tree bearing a certain number of kings, then S. Joseph, the Holy Virgin and Christ. This moiety of sculpture and painting frequented sanctuaries and particularly class churches-this one of their favorite subjects after the end of the 12 th century. Many of our cathedrals closed under the name of the Holy Virgin present the tree of Jesse in the vocabulary of the principal portal. One very well sculptured is seen on the middle portal of the cathedral of Amiens, in the transmarine vocabulary as the right hand on entering. The Jesse (4) is represented seated according to custom, covered by the lateral one: above him is placed King David crowned, and the entire succession of Kings. Also a tree of Jesse is seen, sculptured at the beginning of the 12 th century, at the central portal of the cathedral of Laon; one of the 13 th century on the central of the cathedral of Rouen, etc. Thirteen kings of the 12 th century over the entrance of the cathedral of Chartres represents the tree of Jesse, which is one of the most **beautiful** examples of the art of glass painting at that epoch; their Jesse lies on the ground, at the foot of which burns a lamp. There likewise exists very beautiful painted glass of the tree of Jesse, representing the genealogical tree in the chapel of the Virgin of the abbey church of S. Denis. These are also found from the 13 th century in the cathedrals of Tours, Amiens, Chartres, of the S. Chapelle of Paris. One of the most remarkable examples of the painted glass of the 16 th century, that exists in France is seen in one of the musical chapels of the cathedral of S. Etienne of Pontoise, and represents a tree of Jesse; there are also found of the same epoch in the cathedrals of Auxerre, Nans, etc. They were sometimes carried on copper or brass of bronze. Not long since there existed a tree of Jesse [illegible] S. Denis, in Paris, [illegible] in the Jesse [illegible] in the [illegible].

(4) [illegible]

JESSE, ARBRE DE. Tree of Jesse.

Genealogy of Christ. In the gospel of S. Matthew it is said, that Jesse was the ancestor of David the king, and that from this king to Jesus Christ was 28 generations. Now in many of our religious monuments the genealogy of Christ is represented as commencing with Jesse, from whom grows the trunk of a t tree bearing a certain number of kings, then S. Joseph, the Holy Virgin and Christ. This motive of sculpture and painting furnished sculptors and particularly glass-painters with one of their favorite subjects after the eud of the 12 th century. Many of our cathedrals placed under the name of the Holy Virgin present the tree of Jesse in the voussoirs of the principal portal. One very well sculptured is seen on the middle portal of the cathedral of Amiens, in the intermediate voussoirs at the right hand on entering. The Jesse (1) is represented asleep according to custom, covered by the Jewish cap; above him is placed king David crowned, and the entire succession of kings. Also a tree of Jesse is seen, sculptured at the beginning of the 13 th century, at the central portal of the cathedral of Laon; one of the 16 th century on the portal of t the cathedral of Rouen, etc. Stained glass of the 12 th century over the entrance of the cathedral of Chartres represents the tree of Jesse, which is one of the most beautiful examples of the art of glass painting at that epoch; there Jesse lies on the bed, at the foot of which burns a lamp. There likewise exists very beautiful stained glass of the time of abbot Suger, representing the genealogical tree in the chapel of the Virgin of the abbey church of S. Denis. These are also found from the 13 th century in the cathedrals of Rheims, Amiens, B Bourges, of the S. Chapelle of Paris. One of the most remarkable examples of the stained glass of the 16 th century, that exists in France is seen in one of the apsidal chapels of the church of S. Etienne of Beauvais, and represents a tree of Jesse; they are also found of the same epoch in the cathedrals of Autun, Sens, etc. They were sometimes carried on corner po posts of houses. Not long since there existed a tree of Jesse on the angle of a house in Rue S. Denis, at Paris. One nearly intact is on the angle of a house at Sens.

JOINT. Joint.

JOINT. Joint.

A vertical separation between two cut stones, filled with mortar or plaster. Each ashlar is always placed between two horizontal beds A B, C D (1) and two vertical joints A C, B D. (Art. construction).

In the constructions of the middle ages, the joints were at first very thick until the 11 th century, and then became very thin, particularly in the southern provinces and in Burgundy, and are nearly without mortar; they becmae thicker toward the middle of the 12 th century, and the stones were set on a bed of mortar without being faced after setting, these joints in mortar not being rubbed with an iron, but simply cut with the trowel. The constructors not cutting the facings no longer rejointed the masonry.

Yet there are some provinces like Auvergne, where during t the 11 th and 12 th centuries, mortar joints were made slightly projecting beyond the surfaces and were cut with sharp edges, as indicated by the section (2); but those joints generally only applied to small stones. For example, they enclosed f facings composed of materials of different colors, forming a around each stone a band about 0.4 in. uide, projecting 0.04 in. beyond the face of the wall. This sort of joints was made after setting, were rubbed and carefully cut with irons. The mortar is very hard, but has not always a perfect adherence to that which served for setting, and that it was necessary to r remove to a certain depth to rejoint.

One likewise sees in th edifices of the end of the 11 th century in the southern provinces adjoining the Centre, like the church of Sa Sernin of Toulouse, for example, projecting joints with convex section (3). Those by not stopping the water that runs down those roofs, are less subject to disintegration by the effect of frost.

The duration of the joints depends muchnon the quality of t the stone employed. With porous limestones, very rough silicious limestones, excellent joints are made; it cannot be the same with sandstone, that never adheres perfectly to mortar because of its special aptitude for absorbing moisture. Then mortars dry and rapidly disintegrate. So we have observed in some monuments of Alsace, as for example at the cathedral of Strasburg,[1] that the constructors (to avoid on the inclined planes

or artifacts locally exposed to rain, the disintegration of the coarse joints, always occupying a essentially near the external surface, and in some areas of those joints little possible to lead the water on as surfaces and crevices are more fine weathered.(4).

Note 1.a.142. Face of a buttress of the tronnept exposes to rain and rain.

In conclusion, from the report, and one cannot see because our family journey, as the tower and even the Gothic work to-by involved great memory, each center is a church, then a town hall. The merit cause preserved only on construction of towns a very considerable value. But other joints are case joints, either in corner or in planes. Under circumstance of being standing of the stone, the before surface and cracks remain c crevices into which water enters has dried this original weathering. The city means to employ man stone structures are process, is to set the stones with the layers on a bed of mortar; usually the see clear mineral, as for example in resisting work; a due to cracks to be done with extreme care. In this case w and the central motor begins to set, it is necessary to m it in air from cool until refusal; then to restore some time layer to a depth of 2.0 to 3.4 inc. It is well understood, t and. made to any note is more noticeable to bone than to joints.

The reconstruction of the middle ages frequently imposed joints in marble in rosettes, clamps in pad or rings on yellow ground, or in white on in dense ground. (Art. Painting).

Prof. Good Sir Sa. Four Left. Moo. Fulcis.

The room lots obtained to the Emmanuel of the original m-ment; it was been an stuvent valley floor in the court between from the northern southwest in the new. The s some primary rate that the lantern taken from the colonies of Amment, ... [illegible] ... [illegible] ... over the basic inscribed the obsole from the cool lofe.[1] S factory of Tera Innocens the poor lots of the source of E. Jocran.[2] Pope Marin I based the church of the council of the Lamman to be read from the poor lots of our qualice. The chrisiarie of Constemance ordained the empire of the source to be read bance. From the poor lots were also ... [illegible] ... Sanisiden, the process of mosaicness; one that cross

or surfaces directly exposed to rain, the disintegration of t the mortar joints, always crumbling and especially near the e external surface), cut at both sides of those joints little grooves to lead the water on he ssrface and protect the mortar from washing.(4).

Note 1.p.146. Face of a buttress of the transept exposed to wind and rain.

In principle, from the moment when one cannot set stones perfectly jointed, as did the Greeks and even the Romans when they employed grand masonry, much better is a thick, than a thin joint, the mortar being preserved only on condition of forming a very considerable volume. The worst joints are cast joints, either in mortar or in plaster. Water evaporating or being, ab-absorbed by the stone, the mortar shrinks and there remain c crevices into which enters the dust that produces vegetation. The only method to employ when stone structures are erected, is to set the stones with the lewis on a bed of mortar; caulking is sometimes directed,,as for example in resuming work; b but it requires to be done with extreme care. In this case w when the caulking mortar begins to set, it is necessary to ram it in with iron tools until refusal; then to rejoint some time later to a depth of 2.0 to 2.4 ins. It is well understood, t that what we say here is more applicable to beds than to joints.

The architects of the middle ages frequently imitated joints in painting in interiors, either in red or white on yellow ground, or in white on an ochre ground. (Art. Peinture).

JUBE. Rood Screen. Rood Loft. Ambo. Pulpit.

The rood loft belonged to the furniture of the primitive ch-church; it was then an elevated gallery placed at the choir between that and the believers collected in the nave. From th that gallery were read the lessons taken from the epistles or gospels, and even sermons were preached. Prudentius relates that the bishop instructed the people from the rood loft.[1] G Gregory of Tours describes the rood loft of the church of S. Cyprian.[2] Pope Martin I caused the canons of the council of the Lateran to be read from the rood loft of that basilica. The capitularies of Charlemagne ordained the edicts of the prince to be read there. From the rood loft were also chan-the the Hallelujah, the proses or sequences; but that custom

was not remarkable. From the time of William Lazend, an already
ancient on the floor, and massaged so the rood loft only or
have of rood festivals to read the lessons.

Note 1.p.147. Hymn of S. Hippolyte.

[illegible]

This is not the place to seek to describe the different so-
ros of rood lofts, but mention in the cathedrals of the Sees
and Year during the first centuries; it is certain that the
moo of the Greek and Latin churches until the 14 th century,
was not so all in form that we understand today by rood lofts
ins across of S. Vitale of Ravenna, of S. Mark of Venice, S. S
Clement at Rome, S. Ambrose at Milan, the cathedral of Siena,
and church of S. Marino at Florence, are rather great galleries
also to contain several persons, than rood lofts like those
of our western churches, that from the 12 th century at least
form a separation, a sort of raised gallery between the upper
part of the nave and the back of the choir. In the abbey cha-
pelle of the West, these rood lofts served thus as a front c
[illegible]
erected by large doors, but most frequently by only one. Two
stairs assembled to it, one at the right entering at the sain-
tis side, the other at the left at the corpsel side; this did
not prevent the upper gallery from being in a single extent
from one side to the other of the nave, like the gallery. Un-
fortunately there does not exist in France a single rood loft
of an early epoch, and yet our abbey churches and all our ca-
thedrals possessed them, and also many parish churches. Howe-
ver it must be added that the great cathedrals until about
the end of the 12 th century and the beginning of the 13 th,
[illegible]
Rouen, were not originally provided to receive rood lofts and
[illegible]
middle of the 13 th century, that dioceses or chapters caused
the erection of rood lofts before the choirs of cathedrals.
Still Thiers states that the cathedral of Pamiers[1] until era
ture possessed a very old rood loft, since he gives it a date
of the 3 th century (which is not possible, the cathedral ha-
ving been built at the end of the 12 th century). But his de-
scription is interesting, for it indicates to us that this
rood loft, according to the primitive tradition, was separated

was not retained. From the time of William Durand, men already chanted on the floor, and ascended to the rood loft only on days of great festivals to read the lessons.

Note 1.p.147. Hymn of S. Hypolite.

Note 2.p.147. Book I. Mirac. Chap. 44.

This is not the place to seek to describe the different sorts of rood lofts, that existed in the churches of the East and West during the first centuries; it is certain that the ambo of the Greek and Latin churches until the 14 th century, was not at all in form what we understand today by rood loft. The ambos of S. Vitale of Ravenna, of S. Mark of Venice, S. L Laurent at Rome, S. Ambrose at Milan, the cathedral of Siena, the church of S. Miniato at Florence, are rather great pulpits able to contain several persons, than rood lofts like those of our western churches, that from the 12 th century at least form a separation, a sort of raised gallery between the upper part of the nave and the back of the choir. In the abbey churches of the West, these rood lofts served thus as a front c closure of the choir of the religious, an enclosure sometimes pierced by three doors, but most frequently by only one. Two stairs ascended to it, one at the right entering at the epistle side, the other at the left at the gospel side; this did not prevent the upper gallery frsm being in a single extent from one side to the other of the nave, like the gallery. Unfortunately there does not exist in France a single rood loft of an early epoch, and yet our abbey churches and all our cathedrals possessed them, and also many parish churches. However it must be stated that the great cathedrals built about the end of the 12 th century and the beginning of the 13 th, like those of Noyon, Paris, Chartres, Bourges, Rheims, Amiens, Rouen, were not originally arranged to receive rood lofts and enclosures of choirs. (Art. Choeur). It was only about the middle of the 13 th century, that bishops or chapters caused the erection of rood lofts before the choirs of cathedrals. Still Thiers claims that the cathedral of Sens [1] until his ti time possessed a very old rood loft, since he gives it a date of the 8 th century (which is not possible, the cathedral having been built at the end of the 12 th century). But his description is interesting, for it indicates to us that this rood loft, according to the primitive tradition, was separated

into two ambos. "He says, that they are of stone,[2] separate f from each other; the crucifix is between the two.[3] They are supported in front by four stone columns, that form three front arches. Each has its entrance next the choir, and each i its exit next the nave, at both sides of the principal gate of the choir. Most other galleries of that sort have each only one stairs by which one enters and leaves. What is peculiar to the galleries of Sens is that the epistle is chanted in that on the left on entering the choir, and the gospel in that on the right." Not only is it impossible to grant the rood loft of Sens the age given it by Thiers, but it is even very doubtful that this rood loft precedes the 13 th century. Until the 14 th century the cathedral of Sens possessed only one transept, conforming to the arrangement of several great episcopal cathedrals built, at the end of the 12 th century or beginning of the 13 th; it consisted of a single nave wit side aisles extending around the sanctuary with three chapels; one squar e at the apse and two placed at the sides at the height of the existing lower choir.[4] One therefore cannot indicate the place of a rood loft contemporary with the church of the 12 th century. Always following the scheme of the cathedrals of that epoch, one sees only that the enclosure around the sanctuary may have been foreseen. Now there is scarcely a rood loft with enclosure. We therefore cannot regard the opinion of Thiers as sufficiently based to admit, even exceptionally in France, that there existed rood lofts in cathedrals built by the lay school from 1160 to 1230. We shall more readily admit, t that in those edifices could have been erected ambos or great pulpits, like those of S. Mark of Venice, except in style; b but certainly the sanctuary was entirely open and often on a level with the side aisle, as at Notre Dame of Paris, Meaux, Sens, and originally at Senlis. Rood lofts only appeared in c cathedrals after the act of union of the barons of France in November, 1246, i.e., when the bishops were compelled to renounce their claim to have knowledge of all judicial suits under pretext, that every suit resulted from a fraud, and that every fraud was a sin, so that it was for the religious authority to judge actual affairs, personal or mixed, feudal or criminal cases and even simple offenses. By the firmness of the k king S. Louis and by the establishment of his royal bailiffs

and the organization of the parlement, the bishops were compelled to restrict themselves to their spiritual jurisdiction, or to that possessed by the feudal lords; unable, as they had hoped at the beginning of the 13 th century, to make of the cathedral the seat of every kind of jurisdiction, to content themselves with building episcopal churches, and shutting themselves within their chapters in those vast sanctuaries, erected under the inspiration both political and religious. (Art Cathedrale).

Note 1.p.148. Direct. eccles. sur les jubes des eglises. Paris. 1888.

Note 2. Chapter III.

Note 3.p.148. It is probable that this separation was not such that it was necessary to descend from the right ambo to ascend the left one, since the entirety formed three arches, unless admitting that the middle arch was merely an arch supporting the crucifix.

Note 4.p.148. That arrangement, of which we have found traces very visible in elevation, is confirmed by recent excavations, that MM.Lance, diocesan architect and Lefort, inspector, had the courtesy to have executed under our eyes.

We have given in Art. Choeur illustrations of rood lofts, those of the abbey church of S. Denis and of the cathedral of Paris. According to those arrangements were erected the rood lofts of Notre Dame of Chartres, S. Etienne of Bourges, Notre Dame of Amiens, cathedral of Rheims, from 1250 to 1500.[1] that of the cathedral of Alby, which dates from the beginning of the 16 th century; those of the church of Madeleine at Troyes, S. Etienne-du-Mont at Paris, S. Florentin of Argues, which s still exist, are remarkable works of the epoch of the Renaissance.

Note 1.p.149. All these rood lofts have been destroyed.

There is preserved in one of the chapels of the crypts of N Notre Dame of Chartres the remains of the old rood loft removed in the last century (18 th) by the chapter. Those fragments all belong to the middle of the 13 th century, and are of rare beauty, entirely painted and gilded; they were discovered by the late Lassus, our colleague and friend. We found recently beneath the pavement of the choir of the cathedral of Paris, restored by order of Louis XIV, a quantity of the remains of the rood loft, that dated from the beginniug of the 14 th cen-

century, and was of incomparable refinement in execution. Unfortunatelw those fragments are not sufficiently numerous to be able to restore in certainty and in all parts those charming monuments. Of all rood lofts still possessed in France, t that of the cathedral of Alby is certainly the largest, most complete and most precious; charged with an infinite multitude of sculptures and delicate carvings, it presents one of t the most extraordinary specimens of Gothic art, carried to t the last limits of delicacy and complication of forms. Some churches of Brittany still retaiu their wooden rood lofts; we cite as the most remarkable that of S. Fiacre at Faouet, which dates frsm the end of the 16 th century. It is entirely painted.

JUGEMENT DERNIER. Last Judgement.

This subject is frequently represented, either in sculpture or in painting, and our churches of the middle ages. But the manner of representation differs according to the time and a according to the provincial schools.

On the portals of abbey churches we see the last judgement first assuming an important place; but in the 13 th century, it appeared in the tympanums of the principal portals of cathedrals, parish churches and even of chapels.

On the portal of the cathedral of Autun, whose erection was about 1140, we see sculptured one of the earliest and most c complete last judgements. Christ occupies the central part of the tympanum; beside him an angel weighs the souls and the d devil awaits the damned. On the lintel at the right of Christ are the elect, who look toward heaven. A colossal angle takes singly the souls of the happy and passes them through a window into a palace, that represents paradise. At the left of the Saviour are the condemned; an angel armed with a spear prevents their communication with the elect. The damned are nude a and hold their heads with their hands. Already in that sculpture the dramatic idea dominates; expressions are rendered w with wild vigor, that lacks neither style nor nobility. But at the beginniug of the 13 th century artists are pleased to represeut in an extended manner the scenes of the last judgement, and only then do they occupy the tympanums over the doonways, but the lower voussoirs od the arches. The last judgment of the central portal of the cathedral of Paris is one

of those best treated. The lintel is entirely occupied by pe-
sons of different conditions leaving their tombs, accused by
two angels at each side sounding trumpets. All these persons
are clothed; there is to be seen a Pope, a King, soldiers, w
women and a nuero. In the upper zone at the middle is an ang-
el weighing the souls; two demons endeavor to depress the sc-
ale at their side. At the right of Christ are the elect, all
clad in long robes and crowned. These elect are represented
as beautiful, young and smiling; they look toward Christ. At
the left a demon drags a multitude of naked souls weighing
the contents of their conditions. The expressions of these pe-
sons are rendered with rare talent; terror and despair are de
picted in their faces. In the upper part at the centre is
seated Christ, who shows His wounds; two angels sounding at r
right and left hold the instruments of the passion; then are
[illegible] Christ, [illegible] the Cross. The
vangeiers at the side of the crucified are occupied at the
lower part by scenes from hell, and at the side of the elect
by an angel and patriarchs, among whom Abraham holds souls in
his lap; then are grouped the elect. That remarkable sculpture
dates from 1210 to 1215; it was entirely painted and gilded.

We find the same subject represented at the cathedrals of
Chartres, Amiens, Reims and Bordeaux. But in the last reliefs,
the souls are generally represented as nude, excepting the e
lect, and the compositions are far from equaling that of Ch-
artres Cathedral of Paris. The drapery feeling is already exaggerated,
[illegible] [illegible]
devils are more ridiculous than frightful. Vanity always the
[illegible] of hell is represented by an enormous mouth vomiting
flames into the midst of which demons plunge the damned. In
one 14 th century this sculpture often possessed, I
lieve much of its importance; the figures are too numerous and
[illegible], and the artists in seeking reality entirely scorns and
persons, and have taken from their sculpture the character
of grandeur, so well known at Paris. Relicts representing the
last judgement are seen on the portal of the Literary at the c
athedral of Rouen, and on the principal portal of church S.
Trophin of Troyes, both date from the 14 th century, and wer-
on by these details, if not by the entirely, still present
[illegible]

of those best treated. The lintel is entirely occupied by persons of different conditions leaving their tombs, aroused by two angels at each side sounding trumpets. All these persons are clothed; there is to be seen a Pope, a king, soldiers, w women and a negro. In the upper zone at the middle is an angel weighing the souls; two demons endeavor to depress the scale at their side. At the right of Christ are the elect, all clad in long robes and crowned. These elect are represented as beardless, young and smiling; they look toward Christ. At the left a demon pushes a multitude of chained souls wearing the costumes of their conditions. The expressions of those persons are rendered with rare talent; terror and despair are de depicted in their faces. In the upper part at the centre is seated Christ, who shows his wounds; two angels standing at r right and left hold the instruments of the passion; then are kneeling the Virgin and S. John, imploring the Saviour. The voussoirs at the side of the condemned are occupied at the lower part by scenes from hell, and at the side of the elect by an angel and patriarchs, among whom Abraham holds souls in his lap; then are grouped the elect. That remarkable sculpture dates from 1210 to 1215; it was entirely painted and gilded.

We find the same subject represented at the cathedrals of Chartres, Amiens, Rheims and Bordeaux. But in the last reliefs, the souls are generally represented as nude, excepting the e elect, and the compositions are far from equaling that of Notre Dame of Paris. The dramatic feeling is already exaggerated, the groups are confused, the condemned are grimacing, and the devils are more ridiculous than frightful. Nearly always the entrance of hell is represented by an enormous mouth vomiting flames,into the midst of which demons plunge the damned. In the 14 th century this subject, although often represented, l loses much of its importance; the figures are too numerous and little, and the artists in seeking reality multiply scenes and persons, and have taken from their sculpture that character of grandeur, so well drawn at Paris. Reliefs representing the last judgement are seen on the portal of the library at the c cathedral of Rouen, aud on the principal portal of church S. Urbain of Troyes, that date from the 14 th century, and which by their details, if not by the entirety, still present sculptures treated with rare skill. The glass of rose windows

was often occupied by scores of the last judges from the beginning of the 14 th century. Those of the rose window of Mans, which belong to that epoch, are very beautiful. The some rose window of the cathedral of Sens (16 th century) presents very good paintings of the same subject. But the best paintings on glass of the last judgment, of the season of the Resurrection, are those of the S. Chapelle of the castle of Vincennes, attributed to Jean Cousin. These exist some moral paintings of a the last judgment in France: we particularly mention those of the cathedral of Alby, which dates from the 15 th century.

[illegible]. Lyre. [illegible].

[illegible]. Lyre. [illegible].

[illegible]. Labyrinth. [illegible].

It was unknown during the middle ages to place in the middle of the nave of certain great churches a pavement of white and black stones or of colored tiles, forming by their combinations complicated meanders, to which was given the name of labyrinth, road of Jerusalem, or of place. We cannot trace the origin of this sort of pavement. V. Louis Paris in his Memoire du monister de Notre Dame de Reims, claims that these pavements were a remembrance of some pagan tradition; that is possible; yet no mention of them is made in William Durand, or in authors preceding him, who have written on matters concerning churches. The earliest labyrinths known to us not earlier than the end of the 12 th century, and Lord de Chamont in his Voyage d'outrer en Jerusalem,[1] in speaking of the labyrinth of Crete,[2] says meaning that can cause one to believe in a tradition of this nature, i.e., an association of [illegible] those that he had evidently seen traced on the pavement of the churches of his country. The labyrinth of the cathedral of Bayeux is called Jadalis, meander, place or road of Jerusalem. Some archaeologists have tried to see in these pavements with combinations of concentric lines a copy of the mazes of works, based on this fact, that those of these labyrinths, those of Chartres, Reims and Amiens, recreate in certain combinations the figures of the arcanisses that adorned the

was often occupied by scenes of the last judgment from the beginning of the 13 th century. Those of the rose window of Mantes, which belong to that epoch, are very beautiful. The south rose window of the cathedral of Sens (16 th century) presents very good paintings of the same subject. But the best paintings on glass of the last judgment, of the epoch of the Renaissance, are those of the S. Chapelle of the castle of Vincennes, attributed to Jean Cousin. There exist some mural paintings of t the last judgment in France; we particularly mention those of the cathedral of Alby, which date from the 15 th century.

KARNEL. (Art. Chateau).

KEMINEE. (Art. Cheminee).

LABYRINTHE. Labyrinth. Maze.

It was customary during the middle ages to place in the middle of the nave of certain great churches a pavement of white and black stones or of colored tiles, forming by their combinations complicated meanders, to which was given the names of labyrinths, road of Jerusalem, or of place. We cannot state the origin of this sort of pavement. M. Louis Paris in his Memoire du mobilier de Notre Dame de Rheims, claims that these pavements were a reminiscence of some pagan tradition; that is possible; yet no mention of them is made in William Durand, or in authors preceding him, who have written on matters concerning churches. The earliest labyrinths known to us not earlier than the end of the 12 th century, and lord de Caumont in his Voyage d'outremer en Jherusalem,[1] in speaking of the labyrinth of Crete,[2] says nothing that can cause one to believe in a tradition of this nature, i.e., he establishes no point of comparison between the labyrinth of the Minotaur and those that he had evidently seen traced on the pavement of the churches of his country. The labyrinth of the cathedral of Rheims is cadded dedalus, meander, place or road of Jerusalem. Some archaeologists have desired to see in those pavements w with combinations of concentric lines a sport of the masters of works, based on this fact, that three of these labyrinths, those of Chartres, Rheims and Amiens, represent in certain compartments the figures of the architects that erected the

extendeds. To shall refrain from solving the question. The finds dwellings of most of those labyrinths in the work of M. Ame, Isocad; correlates smallies du moyen age et de la Renaissance. M. Vallet in his description of the crypt of S. Martin of St. Ouen, establishes that the believers must follow on their knees the numerous windings traced by the lines of these meanders, in memory of the passage that Jesus made from Jerusalem; in Auxerre, the labyrinth of Saint-Germain-de-Talmyville (Alberia) among its pavement a mosaic, that one can take for one of these labyrinths, i.e., a conditioned meander. For what Basilica Rural [illegible], ve 9, T. Primary [illegible]. But question one from the Rome after the first crusades? Or is it a local symbolic? We are inclined to think that the representation of meanders of works in these cathedrals is connected with some mystic ground accepted by the school of lay masters, since we see these labyrinths appear in the pavements of cathedrals, only at the moment when religious structures fell into the hands of this commercial school. If these meanders had been traced to recommend the courses of Jesus from Jerusalem [illegible]. If it [illegible] have recalled the stations, or it lost the last one: now nothing like this is noted on any labyrinth still existing, or in some of which drawings have remained to us. Further, we find annuled tiles recommending conformations of lines in meanders so small, that certainly one cannot follow those complicated ways either on foot or on knees, whose sure of these labyrinths, like that of the abbey church of Tonnerre, are not more than 10 inc. square. Actually the last meanders date from the 14 th century, and may date for copies of larger meanders; but again the small or the large contain no religious emblem.

Note 1.p.152. In 1412.published by Morelle de la Bronie. Paris. August. 1928.

Note 2.p.41.

LABYRINTHE. Beam. Wall Beam.

[illegible] horizontally alone a wall to console or bearing a girder, trusses are joined and just the joints of floors, whose construction remains visible. A (1) is a beam fixed on a wall, and B 2 are beams bearing a girder. In the last case, the beams b were fastened to the girder by means of long iron pins, keys

cathedrals. We shall refrain from solving the question. One finds drawings of most of those labyrinths in the work of M. Ame, lacced; Carrelages emailles du moyen age et de la Renaissance. M. Vallet in his description of the crypt of S. Bertin of S. Ouen, establishes that the believers must follow on their knees the numerous windings traced by the lines of these meanders, in memory of the passage that Jesus made from Jerusalem to Calvary. The little basilica of Reparatus at Orleansville (Algeria) shows in its pavement a mosaic, that one can take for one of those labyrinths, i.e., a complicated meander. Now that basilica dates from 328, as M. F. Prevost believes. Did that custom come from the East after the first crusades? Or is it a local tradition? We are inclined to think that the re representation of masters of works in these pavements is connected with some masonic symbol adopted by the school of lay masters, since we see those labyrinths appear in the pavements of churches, only at the moment when relegious structures fell into the hauds of that powerful school. If these meanders had been traced to represent the passage of Jesus from Jerusalem to Calvary, it is to be believed that a religious sign would have recalled the stations, or at least the last one; now nothing like this is noted on any labyrinth still existing, or on those of which drawings have remained to us. Further, we find enameled tiles representing combinations of lines in meanders so small, that certainly one cannot follow those complicated ways either on foot or on knees, since some of these labyrinths, like that of the abbey church of Toussaints, are not more than 10 ins. square. Actually the last meanders date from the 14 th century, and may pass for copies of larger works; but again the small or the large contain no religious emblem.

Note 1.p.152. In 1418.published by Marquis de la Grange. Paris. Aubry. 1858.

Note 2.p.41.

LAMBOURDE. Beam. Wall Beam.

A carpentry term that serves to designate a timber placed h horizontally along a wall on corbelr or beside a girder, into which are gained and rest the joists of floors, whose construction remains visible. A (1) is a beam fixed on a wall, and B B are beams beside a girder. In the last case, the beams b being fastened to the girder by means of long iron pins, keyed

oaks or sycamores. (s.v. Plancher). The same name is also ex-
ed to small boxes of wood placed on floors and serving to n
hail the doorkeeper; but paraclerey not being very ancient in F
rance, the name applied to those long strips is very modern.

(17). Hallway. Couloir.

Only vestiges of the ancient edifice in Gentrance a feeling of
smoke boards. The modern of the 12,ro, 14 th and 15 th cen-
turies in the interior is frequently covered by wainscot in
the form of round or pointed tunnel vaults. This is then ceil-
ed paraclerey.(Fr. Charpente). This ceiling was always cover-
ed by painting more or less rich. One still sees many in Be-
lleny, Tormandy and Picardy. The great hall of the palace m
ween is certain by arrooden ceiling. The hall of the hospital
of Tonnere likewise possesses an enormous ceiling roof (Arts.
Moral-Orem, Hallet). Also frequently the lower walls of halls
or chambers were wainscoted, i.e., by boards with between bal-
ustrade the pavement. This wainscot was detached from the wall
and lasted on turning screws fastened with plaster in the on-
ness A. (1). Thus was avoided the increase or the walls, wim-
ch would lessen the height.

(18). Gate way. Gateway of the Tower.

A gate way door or one terminated at its summit by a little
architrave with a window and a little door at its base, desig-
ned to indicate after at night the location of a religious es-
tablishment or a convent. (Old French text).[1]

Note 1.p.158. La Chronique de Rouen (13 th century), publi-
ed by Alfred Pierre, Hardy, Rouen, 1887.

The provinces of the German and West of France still retain
quite a great number of those monuments, so as to cause the
association, that they were formerly very common. Perhaps one
would seek in these structures an ancient tradition of Celt-
ic hall. Indeed these are the territories in which are found
the round stones or menhirs, which present very frequent ex-
amples of inscions of the dead. The words Langres, Langres a
pparing dance,[2] have etymologies that indicate a sacred place,
a sanctuary, a temple. Later, interwing in Gerin sculpture brick,
ember, rock, mass of stones; omnos in Greek is luminous, a
ssum; omnes, the god of light; fanum, a consecrated place;

bolts or stirrups. (Art. Plancher). The same name is also given to small strips of wood placed on floors and serving to n nail the parquetry; but parquetry not being very ancient in F France, the name applied to those long strips is very modern.

LAMBRIS. Wainscot. Ceiling.

Only employed in the middle ages to designate a facing of s smooth boards. The woodwork of the 13,th, 14 th and 15 th centuries in the interior is frequently covered by wainscot in the form of round or pointed tunnel vaults. This is then ceiled carpentry.(Art. Charpente). This ceiling was always covered by paintings more or less rich. One still sees many in Brittany, Normandy and Picardy. The great hall of the palace at Rouen is covered by a wooden ceiling. The hall of the hospital of Tonnerre likewise possesses an enormous ceiled roof (Arts. Hotel-Dieu, Salle). Also frequently the lower walls of halls or champers were wainscoted, i.e., by boards with battens below the tapestries. This wainscot was detached from the wall and nailed on furring strips fastened with plaster in the chases A. (1). Thus was avoided the dampness of the walls, always quite dangerous in houses.

LANTERNE DES MORTS. Lantern of the Dead.

A hollow pier or one terminated at its summit by a little structure with a window and a little door at its base, designed to indicate afar at night the location of a religious establishment or a cemetery. (Old French text).[1]

Note 1.p.155. La Chronique de Reims (13 th century), published by Louis Paris. Paris. Techener. 1837.

The provinces of the Centre and West of France still retain quite a great number of those monuments, so as to cause the supposition, that they were formerly very common. Perhaps one should seek in these structures an ancient tradition of Celtic Gaul. Indeed these are the territories in which are found the raised stones or menhirs, which present very frequent examples of lanterns of the dead. The words lantern, pharos and burning pharos,[2] have etymologies that indicate a sacred place, a structure, a light. Later, laterina in Latin signifies brick, ingot, rock, mass of bricks; pharos in Greek is luminous, a toron; phanes, the god of light; fanum, a consecrated place;

ger in Delphi, a consecrated spoon; Pausa, to recite formulas of consecration. The Delphic deity of Grade-Dora inscribes a [illegible] whose roof was strewn with mosaical flues.[1] Even in our days in some provinces of France, elevated spoons, usually [illegible] is attributed to the Druids, accordingly in our sanctuaries,[2] used for self-illuminating at night, and for healing the sick, was slept near them in the night preceded S. John. The spoons of the Druids (Dorcelis) among others, overwhelm cosmetical tweezers. It is well to note that the manner of the Druids and a note placed in one page, like several of those elsewhere [illegible]. Were not those notes arranged to reserve a light for [illegible] if they must receive a light, were they placed by the people [illegible] Number [illegible] or Lamp? Whether the [illegible] were those spoons consecrated to the light, the sun, or were consecrative stones intended to avert sickness, to drive away evil spirits, or were concretory spoons, [illegible] of the [illegible] of the Druid Sacrales, it is always the case that the lantern of the middle age, habitually accompanied by a small altar, seem to have been a sacred monument of a certain importance, particularly in the Celtic provinces. It existed at the gates of monasteries, in cemeteries, and principally as the sign of posts and near cemeteries. The may then admit, [illegible] the lanterns of the dead erected on the soil formerly Celtic have corroborated a very ancient tradition, notified by Cornelius.

[illegible] *on the site of S. Efisia, at the time of the settle of Cagliari about.*

Note S.p.185. Ruoma, Recherches sur les langues celtiques; free the work of L. A. Lecourt, Recherches sur l'origin des [illegible].

Note A.p.185. This is not the place to discuss this question, which we propose to treat elsewhere. We must say only that we regard those monuments as belonging to traditions preceding the domination of the Celts.

The first [illegible], William, [illegible] military-lan colliers experienced insurmountable difficulties, when they tried to cause the cossies to abandon certain superstitious practices. They were frequently compelled to give to those processes, when they could not destroy, a different sin

par in Celtic, a consedrated stone; fanare, to recite formulas of consecration. The Celtic deity of Cruth-Loda inhabited a p palace whose roof was strewn with nocturnal fires.[3] Even in our days in some provinces of France, elevated stones , whose erection is attributed to the Druids, erroneously in our opinion,[4] pass for self-illuminating at night, and for healing the sick, who sleep near them in the night preceding S. John. The stone of the maples (Touraine) among others, prevents nocturnal teerors. It is well to note that the menhir of the maples has a hole pierced in one part, like several of those elevated stones. Were not those holes arranged to receive a light? And if they must receive a light, were they pierced by the people that originally erected those blocks or later? Whether the m menhirs were stones consecrated to the light, the sun, or were preservative stones intended to avert sickness, to drive away evil spirits, or were boundary stones, traditions of the travels of the Tyrian Hercules, it is always the case that the lantern of the middle ages, habitually accompanied by a small altar, seems to have been a sacred monument of a certain importance, particularly in the Celtic provinces. It existed at the gates of monasteries, in cemeteries, and principally at the side of roads and near hospitals. One may then admit, t that the lamterns of the dead erected on the soil formerly Celtic have perpetuated a very ancient tradition, modified by Christianity.

Note 2.p.155. There existed a burning pharos near Poitiers, on the site of S. Hilaire, at the time of the battle of Clovis against Alaric.

Note 3.p.155. Edward, Recherches sur les langues celtiques; (See the work of L. A. Lobourt, Recherches sur l'origin des ladreries, moladreries, etc.

Note 4.p.155. This is not the place to discuss this question, which we propose to treat elsewhere. We must say only that we regard those monuments as belonging to traditions preceding the domination of the Celts.

The first apostlesof Gaul, Brittany, Germany and Scandinavian countries experienced insurmountable difficulties, when they tried to cause the peoples to abandon certain superstitious practices. They were frequently compelled to give to those practices, which they could not destroy, a different aim

and barges were, so to speak, for the benefit of the per-
sons, rather than to rank concerning their associates by an
absolute hierarchical of those traditions so dearly possess. M.
de Gaurore thinks [1] that these lanterns of the dead during the
middle ages were especially intended for the service for the
dead brought from afar, and that were not taken into the cem-
ter. We already then that a service occurred in the cemetery,
and that the lantern of the dead took the place of the wax c
candles. That opinion is shared by M. abbe Cousseau; [2] "The m
modern custom alone," says M. Cousseau, "possessed without p
restriction all the rights accessed to the exercise of worship.
ip. That resulted from this, that frequently the lord in mak-
ing a donation of one ancien do a religious corp, made this
restriction on his liberality, that the right of the tiers,
the place of burial, was not conferred in the gift." That
lanterns of the dead were utilized for the funeral services
in cemeteries seems probable; but that was erected columns
several years then to place as their tops in full daylight I
lighted lamps, whose light could be perceived by none, and
this only with the invention of reflecting lighting by wax can-
dles, is doubtful. If the lanterns of the dead had been ident-
ical only to take the place of wax candles during inferments,
it would have been more natural to make them very low, and so
increase that the light could be seen in the daytime by those
cemetery. Quite on the contrary in these little monuments, that
seem designed for the lamp enclosed in their upper lantern to
be seen very far at all points of the horizon. M. Lacourtre,
archaeologist of Poitiers, [3] remarks that "the hollow columns
or lanterns were especially erected in cemeteries concerning
on the principal roads of communication, or were in much fre-
quented places. He thinks that these lanterns were intended
to preserve the living from the fear of ghosts and spirits of
darkness, to prevent them from this nocturnal fear, from that
fear waking in darkness monitored by the pastorat; finally
to invite the living to prayer for the dead." As for the idea
attached to these monuments, for example in the 12 th century,
M. Lacourtre appears to us to be right; but we are no less
[illegible]
to the questions or appreciations of very high antiquity. It
is to be regretted, that no lanterns of the dead concerning m

and divert them, so to speak, for the benefit of the new religion, rather than to risk compromising their apostolate by an absolute disapproval of those traditions so deeply rooted. M. de Gaumont thinks [1] that these lanterns of the dead during the middle ages were especially intended for the service for the dead brought from afar, and that were not taken into the church. He admits then that a service occurred in the cemetery, and that the lantern of the dead took the place of the wax c candles. That opinion is shared by M. abbe Cousseau;[2] "The mo mother church alone," says M. Cousseau, "possessed without r restriction all the rights attached to the exercise of worship. That resulted from this, that frequently the lord in making a donation of the church to a religious body, made this restriction on his liberality, that the right of the tithe, the right of burial, was not comprised in the gift." That lanterns of the dead were utilized for the funeral services in cemeteries seems probable; but that men erected columns several yards high to palce at their tops in full daylight l lighted lamps, whose light could be perceived by none, and this only with the intention of replacing lighting by wax candles, is doubtful. If the lanterns of the dead had been intended only to take the place of wax candles during interments, it would have been more natural to make them very low, and so arranged that the light could be seen in the daytime by those present. Quite on the contrary in these little monuments, that seem designed for the lamp enclosed in their upper lantern to be seen very far at all points of the horizon. M. Lecointre, archaeologist of Poitiers,[3] remarks that "the hollow columns or lanterns were especially erected in cemeteries bordering on the principal roads of communication, or were in much frequented places, He thinks that these lanterns were intended to preserve the living from the fear of ghosts and spirits of darkness, to protect them from this nocturnal fear, from that form walking in darkness mentioned by the Psalmist; finally to invite the living to prayer for the dead." As for the idea attached to these monuments, for examfle in the 12 th century, M. Lecointre appears to us to be right; but we are no less d disposed to believe, that these columns belong by tradition to the customs or superstitions of very high antiquity.[1] It is to be regretted, that no lanterns of the dead preceding the

In an century remain to us; every evidence is not to be dis-
tinct, since mention was made of some sometimes, among others
[illegible]
[illegible] of those first Dorsiana monuments.

[illegible]

[illegible]

[illegible]

Note 1.-1.2. To give here only a small number of examples of the antiquity of that tradition, Herodotus relates, that in the temple of the Tyrian Percules, there was an isolated column of emerald (carbuncle), that of itself lighted the environs [illegible] sitting thor on the summit of Mt. Ida, celebrated in antiquity for the judgment of Paris, there was seen the disco of night fires, which scattered in a sweep before the rising of the sun. Sunrisides sung the same thing in the Trojan Tomes.

One of the most preserved lantern of the dead, dating from the 12 th century is seen at California (1). The little door for manipulating, lighting and removing the lamp, elevated 13 fo. above the circular platform on which rises the sanctuary; which fact makes it necessary to use a ladder to light the lamp and raise it to the top of the flue. The lantern of California, contrary to the alleged ancow, has but a single opening in the top, by which one can perceive the light of the lamp. As for the little shelf placed against the lower opening, it cannot be regarded as an altar, but only as a rest for during the ladder and the lamp to arrange it before raising it.

Another lantern more complete than this, is found in the village of Orson; it dates from the end of the 12 th century. Placed on a broad platform raised 7 meme above the ground, it possesses an altar truly, and at the right of that table is the opening necessary for the introduction of the lamp. (2). Like opening was closed by a wooden shutter. We give as a the plan of the monument of Orson. at 3 is the plan at the level of the altar, but at 6 at the level of the upper lantern. 7-8. 9 represents the elevation and section of the monument, a metal conducted well [illegible]. The lantern is open, so as to allow the lamp to be seen from all parts of the horizon. The 4 columns are perpendicular view and plan of the lantern of the

12 th century remain to us; their existence is not to be doubted, since mention was made of them sometimes, among others at the battle of Clovis and Alaric, but we do not know the f form of those first Christian monuments.

Note 1.p.156. Cours d'antiquities. Vol. VI.

Note 2.p.156. Bull. monum. Vol. IX. p. 540.

Note 3.p.156. Bull. monum. Vol. III. p.452.

Note 1.p.158. To give here only a small number of examples of the antiquity of that tradition, Herodotus relates, that in the temple of the Tyrian Hercules, there was an isolated column of emerald (carbuncle), that of itself lighted the entire interior of that temple. The geographer Pomponius Mela claims that on the summit of Mt. Ida, celebrated in antiquity for the judgment of Paris, there was seen the gleam of night fires, which gathered in a sheaf before the rising of the sun. Euripides says the same thing in the Trojan Women.

One of the best preserved lanterns of the dead, dating from the 12 th century is seen at Celfrouin (1). The little door for introducing, lighting and hoisting the lamp, is elevated 18 ft. above the circular platform on which rises the structure; which fact assumes it necessary to use a ladder to light tha t lamp and raise it to the top of the flue. The lantern of Celfrouin, contrary to the adopted custom, has but a single opening at the top, by which one can perceive the light of the l lamp. As for the little shelf placed beneath the lower opening, it cannot be regarded as an altar, but only as a rest f for placing the ladder and the lamp to arrange it before raising it.

Another lantern more complete than this, is found in the v village of Ciron; it dates from the end of the 12 th century. Placed on a broad platform raised 7 steps above the ground, it possesses an altar table, and at the right of that table is the opening necessary for the introduction of the lamp. (2). That opening was closed by a wooden shutter. We give at A the plan of the monument of Ciron; at B is the plan at the level of the altar, and at C at the level of the upper lantern. Fig. 3 presents the elevation and section of the monument, s still preserved well today. The lantern is open, so as to allow the light to be seen from all parts of the horizon. Fig. 4 presents the perspective view and plan of the lantern of the

dead of Antigny, which dates from the middle of the 12 th century. According to [illegible], the monument rests on the platform of three steps; it is on a square plan, possesses its little altar with one step, a lateral door for the introduction of the lamp, and four openings at the top to allow the light to pass. The top was probably terminated by a cross like the two preceding examples.

The lanterns of the dead lose their character of elevated [illegible], and the isolated column during the 14 th century, and are replaced by little open chapels in which was hung a l [illegible] [illegible] until the end of the 13 th century, gradually changed form [illegible]

[illegible]

[illegible] the upper member of the cornice, and desired to protect the surfaces by casting the rainwater away from the wall.

[illegible] er of the cornice; consequently the rainwater before leaving [illegible] and even frequently when the projection being omitted, the water without obstacle reaches the entire moulding [illegible] ect. If the lay school of the end of the 12 th century subjec- [illegible] did not neglect these mouldings; in execution of this it abandoned Romanesque traditions; it invented profiles in accord with recognized necessities, as it invented a system of con- [illegible] the cornices, i.e., to the courses protecting the surfaces, t [illegible] This profile consisted (?) of a wash A, terminated at bottom [illegible] followed during the 13 th, 14 th and 15 th centuries; [illegible]

dead of Antigny, which dates from the middle of the 13 th century. According to custom, the monument rests on the platform of these steps; it is on a square plau, possesses its little altar with one step, a lateral door for the introduction of t the lamp, and four openings at the top to allow the light to pass. The top was probably terminated by a cross like the two preceding examples.

The lanterns of the dead lose their character of elevated stones, and the isolated column during the 14 th century, a and are replaced by little open chapels in which was held a l lighted lamp. (Art. Chapelle, Fig. 20). So that the old Gaulish traditions, that were perpetuated through Christianity until the end of the 13 th century, gradually changed form until their origins were forgotten.

LARMIER. Geison. Corona and Facia. Cornice.

A moulding taken in the height of a course forming a band or the upper member of the cornice, and designed to protect the surfaces by casting the rainwater away from the wall.

The geison of the Roman cornice has only a slight undercutting A (1) made beneath the projection of the projecting member of the cornice; consequently the rainwater before leaving the protecting stone follows the wash a b, fillet c, corona d and facia e. This principle is nearly followed during the Romanesque epoch, and even frequently then the projection being omitted, the water without obstacle washes the entire moulding to the surface of the wall, that those mouldings should protect. If the lay school of the end of the 12 th century subjected all parts of the construction to absolute reasoning, it did not neglect these mouldings; in execution of this it abandoned Romanesque traditions; it invented profiles in accord with recognized necessities, as it invented a system of construction based on new principles. That school then gave to t the cornices, i.e., to the courses protecting the surfaces, t the profiles most favorable to the rejection of the water. T This profile consisted (2) of a wash A, terminated at bottom by a drip B, sharply undercut. If it was desired to throw the drip water farther from the surface, there was added a moulding beneath the drip. (3). (Art. Corniche). This principle was f followed during the 13 th, 14 th and 15 th centuries; touard

two larger tiles, ran inward to give more firmness to the mass, and instead of ending in plane, it was made concave (4). But since that evidently weakened the arches, and also the frieze A appeared with beside that curved surface, they came to profile the edge of the cornice or dado according to the arches (5). Above the end of the 15 th century. The dado moulding persisted long also in the architecture of the Renaissance; because indeed this profile was necessarily most suitable to endure the surfaces under a close where rains are frequent. As a general rule, the fillet F of the moulding is always drawn perpendicular to the line of the mass. These mouldings are around and twice in the architecture of the 12 th century of Ile-de-France; they are more refined and lower in Champagne; they only appear quite late (about the second half of the 12 th century) in Burgundy, but then they always take the form of a mass with the mass and with the deep dado beneath the mass.

[illegible].

The word "Lateran" is only used in the plural. It is freely admitted that our ancestors in their houses, palaces and castles, are more of those contemporaries, that today one cannot do without (at least in the cities of the North); and that in Versailles the lands of the court of Louis XIV found themselves in the necessity of relieving themselves in the corridors, for lack of closets, from which it is concluded, that with the dukes of Burgundy or of Orleans in the 15 th century, men did not even take such precautions.

That indifference in satisfying the necessities of our physical nature was carried very far in the time, when men particularly thought of practicing noble architecture. Not only the chateau of Versailles, where the court resided during the 18 th century, contained only such a limited number of privies, that all the personnel of the court was obliged seeks in other apartments; but even earlier palaces did not have any whatever. Not long since all the apartments of the Tuileries were without closets, so that each morning it was necessary to have made a general removal by persons for that purpose. He remember the odor disengaged in the time of King Louis XVIII in the corridors of S. Cloud, for the transitions of Versailles were scrupulously retained there. This fact relating

the latter time, men wished to give more lightness to the wash, and instead of cutting it plane, it was made concave (4). But since that evidently weakened the stone, and also the fillet A seemed wide beside that curved surface, they came to profile the edge of the cornice or drip according to the sketch (5), about the end of the 15 th century. The drip moulding persisted long also in the architecture of the Renaissance; because indeed this profile was certainly most suitable to ensure the surfaces under a climate where rains are frequent. As a general rule, the fillet B of the moulding is always drawn perpendicular to the line of the wash. These mouldings are strong and thick in the architecture of the 13 th century of Ile-de-France; they are more refined and lower in Champagne; they o only appear quite late (about the second half of the 13 th century) in Burgundy, and then they always take the form of a slab with wash and with the deep drip beneath the wash.

LATRINES. Privies.

The word "latrines" is only used in the plural. It is freely admitted that our ancestors in their houses, palaces and castles, had none of those conveniences, that today one cannot do without (at least in the cities of the North); and that in Versailles the lords of the court of Louis XIV found themselves in the necessity of relieving themselves in the corridors, for lack of closets, from which it is concluded, that with the dukes of Burgundy or of Orleans in the 15 th century, men did not even take such precautions.[1]

That negligence in satisfying the necessities of our physical nature was carried very far in the time, when men particularly thought of producing noble architecture. Not only the chateau of Versailles, where the court resided during the 18 th century, contained only such a limited number of privies, that all the personages of the court must have pierced seats in their wardrobes; but much smaller palaces did not have any whatever. Not long since all the apartments of the Tuileries were without closets, so that each morning it was necessary to have made a general removal by persons for that purpose. We remember the odor disseminated in the time of king Louis XVIII in the corridors of S. Cloud, for the traditions of Versailles were scrupulously retained there. This fact relating

to Versailles is not exaggerated. One day when we were very young and visited that palace with a respectable lady of the court of Louis XV, passing through a pestilential corridor, s she could not preven an exclamation of regret; "That smell recalls to me such a very fine time!"

Yet if the castles of the middle ages did not present facades arranged for beautiful symmetry, colonnades and pediments, they possessed privies for the lords as for the garrison and servants; they had as many as necessary and very well arranged. At Coucy the towers of the keep of the beginning of the 13 th century have privies in each story, constructed to avoid odor and all inconveniences connected with that necessity. The privies of the keep discharge into a large and well built cesspool, that could be emptied without inconveniencing the enhabitants. As for the privies of the towers, they were placed in the reentrant angles formed by the junctions of those towers and the curtains, casting all sewage outside on the wooded p precipice that surrounded the castle.

Here is one of those privies opening from a landing A communicating with the halls and stairs. B is the curtain, C the tower. From B to D is built a wall corbelled out and covering the seat E. At F is a urinal and at G the window. The sketch H gives the appearance of the privy externally, the sketh I is its section on A X. No odor is to be feared, since the sewage falls on the precipice.

Fig. 2 presents a privy that still exists intact in the castle of Landsperg (Lower Rhine),[1] and like those of the towers of Coucy casts all sewage outside. The seat is entirely corbelled from the face of the wall. Fig. A gives the plan, Fig. B the section, and Fig. 6 the view of the corbelling of the seat with the discharge in perspective. Since there might be reason to fear arrows, that might be shot from outside, one w will note that the constructor had the precaution to place a front slab descending below the two side corbels, so as to entirely protect the legs of the person on the seat, and formed of a simple perforated slab. At night when one went to the p privy, it was the custom to be accompanied by a servant bearing a torch. That custom seems to have been abandoned only v very late. Gregory of Tours relates that a priest died in the privy, while the servant that accompanied him with a torch,

vaulted behind a corbelled but fell over the entrance;[2] and in the memoirs of Jean Barmarin written about 1545, we read that a corner of the room, located at Sonzay as one of the several rooms, some private ones and some for the staff living in servant of the said lodging, both fell through the said entry and were injured. [illegible] There is also mention of passageways, and were accompanied by servants. That evidence may in the private of the middle ages a large space was left before the house, or given a wide or rather long passage between the gate and the entrance.

Note 2.p.164. Book II. Chapter 24.

Note 1.p.164. This drawing was furnished to us by M. Gron, architect. This castle dates from the 12 th century.

Note 3.p.164. Journal du bourgeois de Rouen; Revue rétrospective normande. Pub. by André Pottier. 1842.

Passageways have the object of special ventilation by corridors: we have numerous examples of them in the castles of the middle ages. They were vaulted in stone, with ventilation and [illegible] of common drivies that the architects made proof of care. In castles having to contain a very great garrison, there is always a tower or separate building reserved for placing the drivies. At the castle of Tony between the great hall and the kitchens were important drivies which passages is preserved. The same rooms of drivies arranged for numerous garrison in one of the large castles of Tourlaville (Cotes). In Maitland the castle of Langlay (Northumberland) exists a fine secret building reserved for drivies, that were established in a very monumental manner. The was very fine and large once at the castle of Warcombes, nearly like those of Langlay. The drivies of the castle of Warcombes, built in the 13 th century, adjacent one of the curtains, consist of narrow covered passageways without floors, which drivies (3) [1] communicate in the stories of the principle structures by means of doors and passages (see cross section A). The passage was as C, and the vault was composed of two transverses arches between which passed the three flues from the three stories of basis. These flues were four in each story, and from one branch D (ground story) to the roof, about 2.3 ft. above the upper window F, there were no flues. This ventilation could easily c

waited behind a portiere that fell over the entrance;[2] and in the Memoires of Jehan Berthelin written about 1545, we read t that a knight of the king, lodged at Rouen at the inn of the Cheval Blanc, that having risen and gone to the privy with a servant of the said lodging, both fell through the said privy and were drowned there.[3] In the Cent Nouvelles nouvelles, t there is also mention of personages, who were accompanied by servants. That explains why in the privies of the middle ages a large space was left before the seats, or often a sort of rather long passage between the seat and the entrance.

Note 2.p.164. Book II. Chapter 28.

Note 1.p.164. This drawing was furnished to us by M. Cron, architect. This castle dates from the 12 th century.

Note 3.p.164. Journal du bourgeois de Rouen; Revue retrospectif normande. Pub. by Andre Pottier. 1842.

Cesspools were the object of special attention by constructors; we have numerous examples of them in the castles of the middle ages. They were vaulted in stone, with ventilation and openings for emptying. But particularly in the construction of common privies that the architects made proof of care. In castles having to contain a very great garrison, there is always a tower or separate building reserved for placing the privies. At the castle of Coucy between the great hall and t the kitchens were important privies whose cesspool is preserved. One sees remains of privies arranged for numerous garrisons in one of the three castles of Champigny (Poitou). In England the castle of Langley (Northumberland) exists a four story building intended for privies, that were established in a very monumental manner. One sees very fine and large ones at the castle of Marcoussis, nearly like those of Langley. The privies of the castle of Marcoussis, built in the 13 th century, against one of the curtains, consist of narrow covered st structures without floors, whose privies (3) [1] communicate with the stories of the adjoining structures by means of doors and passages (see cross section A). The cesspool was at C, and i its vault was composed of two transverse arches between which passed the three flues from the three stories of seats. Those seats were four in each story, and from the ground D (ground story) to the roof, placed about 3.3 ft. above the upper window E, there were no floors. Thus ventilation could easily o

occur, and the odor was not carried through the doors B into the adjoining buildings. At F we have traced the section of t the building parallel to the seats,and to show them, we have assumed the balustrades G to be partially removed.

Note 1.p.167. After an old drawing in our possession.

At the castle of Pierrefonds, whose construction dates from 1400, there is a tower beside the barracks of the garrison, for the privies and that was entirely destroyed. We give (4) sketches of that singular structure. At A is reproduced a plan of the tower at the level of the soil outside the castle, which is the ground of the ditch; at C is an opening for removal; at D the ventilator, and at E the mass of cut stones pl placed at the centre of the cesspool to facilitate removal of sewage. Sketch B gives a plan of the second story (ground story for the court of the castle). From the halls G one could reach the privies only by the long corridor F with two doors. the hall H possessed a row of seats at I and a flue L to discharge from the privies of the two upper stories. The perspective section made on B K shows at M the cesspool with the mass N and ventilator O; at P are the seats of the ground story; at R the seats of the second story, and at S the seats of the third story. To show the floors of all the seats, we have assumed the floors removed. The last flue S is extended by a l lateral flue up above the roofs, so as to produce a draft, a and near the extension pipe of that last flue was arrauged a little hearth to increase that draft. It must indeed be recognized that many of our establishments occupied by many persons, such as barracks, colleges and seminaries do not have privies so well arranged as these. Note that by the lateral opening for removal of the central mass, it was very easy to clean out often and quickly; that this central vault contained a considerable volume of air; that it was doubly ventilated, and that consequently not much gas could pass into the rooms, which were ventilated by windows; that also all entrances arranged in the different stories of this tower consisted of long and bent corridors, themselves ventilated and closed by double doors.

In the same castle the privies of the great residence of t the lords or the keep are arrauged with extreme care iu a narrow part of the building and receive air from both sides, is-

isolated and opening the windows of the privies to the North. (Art. Donjon, Figs. 41, 42, 43). It is necessary to state that the windows of the great privies for the garrison jus illustrated in the preceding Fig. likewise open to the North. These minute precautions devoted ts the construction of these important parts of habitations give place to extreme negligence, toward the end of the 16 th century. But then men were preoccupied first of all, in producing what are termed beautiful and symmetrical arrangements; that the convenience of the inhabitants of a palace or house, what we call comforts, was subject to architectural conditions made rather for gods than simple mortals. In closing, we must not omit ts warn our readers against the tales of oubliettes (dungeons) told by all ga guides charged to conduct amateurs of feudal ruins. Nineteen times out of twenty, those oubliettes, that so vividly move visitors to castles of the middle ages, ahe common privies, just as certain torture chambers are kitchens. We have several times seen the cleaniug of the cesspools of castles, that were regarded with respectful terror, as having ingulfed unfortunate men; mingled with much sewage are found a quantity of the bones of rabbits and hares, some coins, potsherds and dead cats in abundance.

LAVABO. Lavatory.

A great basin of stone or marble with water flowing frsm a number of little orifices pierced around its edge, into a lower basin, and designed for ablutions; by extension the name of lavatorw has been given to the room or area in the midst of which rose the fountain. Most cloisters of religious possessed a lavatory. Sometimes it was placed at the middle of t the court under the open sky, more frequently beside one of the porticos of the cloister or in an angle, and then the lavatorw was covered; this was an annex of the cloister toward which the religious passed before entering the refectorw and on returning from the labors in the fields, when they worked there. The Cistersiaus in the 12 th century prided themselves on returning to the first rigors of the monastic life, who e excluded from their monasteries everw luxury aud superfluity, still constructed lavatories in their cloisters,not arranged as a motive of decoration, but as an object of primary necessity.

[illegible] the dimensions of the 12 th century original [illegible]-
ed in this manner [illegible]; it was necessary for them to wait
off the lime covering their hard surface concerning the origin
of the cathedral. Thus we see that the lavatories of Charles-
[illegible] monasteries are an inconsequent case of the director. The a
[illegible] of Pontigny possessed a lavatory whose basin still ex-
ists, that of Fontenay, 12 th century, on the contrary, possess-
ed a secondhand bowl concerning the basin, while that the dis-
[illegible].

Here is the plan of this lavatory; it is a rectangular room a
ed during the course of the cloister concerning which the r
[illegible]; the religious entered the lavatory by the door and
left it by the [illegible], as is to avoid all disorder; thus [illegible]
[illegible] concentrics around the basin to the number of 6 or 8 to
[illegible].

Fig. 2 represents the section of that lavatory on a b.[1] [illegible]-
[illegible] to [illegible] of the order of [illegible], that room is exte-
[illegible], covered by a stone dome of 5 [illegible] ribs in
the [illegible] angles.

Note 1.p.171. See the [illegible] mode after the drawings of
[illegible] under the [illegible] of the minister of state.

The [illegible] of [illegible] [illegible] described on the page 9
[illegible], the [illegible] [illegible] a portion of the cloister a lava-
tory of remarkable construction. (4).[1] It was the refectory.
The [illegible] filled into the lavatory by the arch and left
the [illegible] of [illegible]. A [illegible] column passing through the
basin [illegible] the [illegible] of four [illegible] with [illegible]-
[illegible]. This [illegible] was sufficiently [illegible] to allow 15
[illegible] to [illegible] around the basin, was for like a
the portions of the cloister, and consequently was [illegible]
from wind and sun.

Note 1.p.172. There are still seen in place the two antron-
ses of the lavatory, and we found in 1884 among the rubish
scattered in the cloister, fragments of the pieces of the bell,
[illegible].

Fig. 4 represents a perspective view of this lavatory taken f
from the corner C, showing the vault one from a to b. This v
[illegible] to the seven [illegible], and that must present a [illegible]

Indeed the Cistercians of the 12 th century occupied themselves in rude manual labor; it was necessary for them to wash off the dirt covering their hands before entering the church or the refectorw. Thus we see that the lavatories of Cistercian monasteries are an important part of the cloister. The a abbey of Pontigny possessed a lavatory whose basin still exists, that of Thoronet, 12 th century, on the contrary, possesses a structure that contained the basin, while that has disappeared.

Here is the plan of that lavatory; it is a hexagonal room a adjoining the portico of the cloister extending beside the r refectory; the religious entered the lavatory by one door and left it by the other, so as ts avoid all disorder; thus they ranged themselves around the basin to the number of 6 or 8 to perform their ablutions.

Fig. 2 presents the section of that lavatory on a b.[1] Conformably to the rule of the order of Cîteaux, that room is extremely simple, covered by a stone dome of 5 sides with ribs in the reentrant angles.

Note 1.p.171. See the engravings made after the drawings of M. Questel, in Archives des monuments hostoriques, published under the auspices of the minister of State.

The abbey of Fontenon near Montbard depended on the same o order, and possessed beside a portico of its cloister a lavatory of remarkable construction. (3).[1] 7t A was the refectory. The religious filed into the lavatory by one arch and left by the other at Theronet. A central column passiug through the basin B supported the imposts of four cross vaults with transverse arches. This hall was sufficiently spacious to allow 15 religious at least to stand around the basin, was low like th the porticos of the cloister, and consequently was sheltered from wind and sun.

Note 1.p.172. There are still seen in place the two entrances of the lavatory, and we found in 1844 among the rubbish scattered in the cloister, fragments of the piers of the hall, whose perimeter appeared above the ground of the court.

Fig. 4 presents a perspective view of this lavatory haken f from the point C, assuming the vault cut from a to b. This w was an edifice whose a rangement was rigorously made according to the given programme, and that must present a pleasing

appearance, although its architecture was very simple. The be beautiful limestone materials at the disposal of the religious of Fontenon permitted them to erect this hall with large blocks of stone; the nucleus of the piers is monolithic, the bases and capitals are made of a single course. This mode of construction added to the grand character of the monument in spite of its small dimensions. The abbey of S. Denis possessed a very beautiful basin in its cloister, that served for the a ablutions of the monks; that basin is now deposited at the m middle of the second court of the Ecole des Beaux Arts, dates from the 13 th centurw, and has a remarkable profile, and presents entirely around it between the jets a head sculptured in beautiful style.[1] When the monks could not conduct water into the basin for the daily ablutions, thew contented themselves with a well with a circular or semicircular trough around or near it.

Note 1.p.174. See the engraving of that basin in Examples de decoration of M. Leon Coucherel.

Note 2.p.174. See the cloister of the cathedral of Gerona.

Still in Spain the monasteries possessed magnificent lavatories. The vicinity of the Arab establishments, in which an abundance of water was regarded as a uecessity of the first order, must have exercised a certain influence on the construction of the cloisters. Also in the monasteries of the south of France one formerly lavatories best arranged and most spacious. It is to be regretted that those halls, that lent themselves so well to architectural compositions, have been destroyed e eveeywhere, frsm before the end of the last (18 th) century, by the monks themselves, who no longer submitted to the rule of washing themselves together at the same time. Lavatories sometimes consisted only of a great trough of marble, stone or bronze, placed at the entrance of the refectory. (See Art. Lavoire in the Dictionnaire du Mobilier).

LAVATOIRE. Lavatory for the Dead.

A trough placed in a room near the cloister of a monastery, and serving to place and wash the dead before burial.

The custom of washing the dead before interring them is a practice that dates back iu antiquity,[3] and that was retaiued until the end of the last (18 th) century in some provinces,

as for example in the Basque country, the suburbs of Avranches and Vivarais. Lord de Moleon [4] thus describes the lavatory of the abbey of Cluny:- "In the midst of a very spacious and very long chapel, where one enters the chapter from the cloister, is the lavatory, which is a stone 6 or 7 ft. long hollowed some 7 or 8 ins. deep, with a stone pillow of the same block as the trough; with a hole at the end of one side at the foot, through which the water runs after the washing of the dead." The author gives a drawing of that lavatory, which we present here (1); he adds that there are similar stones in t the hospital of the city of Cluny, in the chapter of the cathedral of Lyons, in the vestiary of that of Rouen, and on nearly all monasteries of the orders of Cluny and of Cîteaux.

Note 3.p.174. See Acts of the Apostles, Chap. 9; Sidonius Apollinare. Book III. Letter 3.

Note 4.p.174. Voyages liturgiques en France. Paris. 1718.

LEGENDE. Legend. Story.

This word in architecture is applied to grouped representations, either sculptured or painted on the wall or on glass, of legendary subjects, as for example the story of the prodigal son, the story of the bad rich man, or indeed certain lives of the saints related in the Legende doree. The portals of o our cathedrals of the middle ages frequently present legendary subjects sculptured on their bases dating frsm the end of the 13 th century. At the cathedral of Auxerre,on the portal of the Calende of the cathedral of Rouen, on the western portal of that of Lyons, are seen very fine sculptures represeuting legendary subjects. But especially on glass extend the i innumerable series of this sort of subjects. (Art. Vitrail).

LICE. Lists. Barrier.

A barrier or palisade, and by extension the space reserved between the two enclosures of a fortified city, or between the walls of the external barriers. (Art. Architecture Militaire). The name of lists was also given to the enclosed fields intended for exercises, jousts, tourneys, passages at arms and judgments of God.

When an army encamped and surrounded itself by a palisade, one said "leave the lists" instead of leaving that palisade.

been secret news from London before William the Passant, he caused his army to be placed behind palisades. On the morning of the battle, Harold sent to reconnoitre the ground; [Old French poem does].[1]

Note 1.p.174. Poème de Hastings. Verse 12, 127.

After the battle of Waterloo or Wavre, being sent to a man F. Louis, that he might be attacked very early the next morning in his camp. (Old French text).[1] Thus in a camp made with haste, the tents forming the barrier were placed about so as to permit man on foot to pass between them. Those tents were formed a series of palisades, that did not prevent the infantry from throwing themselves on the assailants, but which obliged cavalry charges, and allowed the soldiers to rally, if they were connected to passes.

Note 1.p.174. Les [illegible] Hastings. Hastings [illegible].

F. Michel. 1856.

[illegible] of the Tower, [illegible] man to make the round towards, when it was invested. There was a tradition of the martlike palace of the Tower. (Old French poem).[2]

Note 2.p.175. Le prise d'Orange, Histoire of Orange, called of the 11 th and 12 th centuries; published by M. M. L. F. I [illegible].

[illegible] of the city be of masonry, that [illegible] and enclosed by a wooden palisade.

GIEN. Stone. Brace.

A town in Burgundy. - Wooden timber having a tenon as mean and, and that is set obliquely and connects the kingpost with the principal or with the ridge of the carpentry of a roof. (1). A being the kingpost, B the principals, the trusses C a are braces; D being posts and F the ridge, the trusses E are braces.

GLOUCESTER. Cathedral.

Ribs of a cross vault that connect the corns of the diagonal [illegible] the ribs A (1) are liernes. (Eres conductors, Tones).

In carpentry the tiebeams (liernes) are horizontal pieces of

When Harold came from London before William the Bastard, he caused his army to be placed behind palisades. On the morning of the battle, Harold went to reconnoitre the enemy. (Old French poem).[1]

Note 1.p.175. Roman de Rose. Verse 12, 125.

After the battle of Mansourah or Massoure, spies came to w wahn S. Louis, that he would be attacked very early the next morniug in his camp. (Old French text).[1] Thus in a camp made with haste, the piles forming the barries were spaced apart so as ts permit men on foot to pass between them. Those piles thus formed a series of merlons, that did not prevent the infantry from throwing themselves on the assailants, but which stopped cavalry charges, and allowed the soldiers to rally, if they were compelled to retreat.

Note 1.p.176. Hist. de S. Louis. Joinville. Published by M. F. Michel. 1858.

Castles were always surrounded by barriess, i.e., bu barriers of palisades, sometimes with ditches, that protected the foot of the ramparts, and allowed men to make the rounds outside, when it was invested. That was a tradition of the warlike peoples of the North. (Old French poem).[2]

Note 2.p.176. La prise d'Orenge, William of Orange, ballad of the 11 th and 12 th centuries; published by M. W. J. A. J Jonckbloet. 1854.

This means that the castle of the city is of masonry, vaulted and enclosed by a wooden palisade.

LIEN. Strut. Brace.

A term in carpentry. - wooden timber having a tenon at each end, aud that is set obliquely and connects the kingpost with the principal or with the ridge of the carpentry of a roof. (1). A being the kingpost, B the principals, the timbers C a are braces; D being posts and F the ridge, the tembers G are braces.

LIERNE. Robs. Purlines.

Ribs of a cross vault that connect the crown of the diagonal arches with the crowns of the side diagonal arches (tierceons). The ribs A (1) are liernes. (Arts construction, Voute).

In carpentry the tiebeams (liernes) are horizontal pieces of

roof corresponding at each base by triangular lancettes are used, to receive the points of the false floors. They are also curved circular closed horizontally between the pinnacles of a conical roof, and which serve to receive the rafters, when these are to be secured at nearly equal distances in the region of the roof. The cimaces 4 (2) are lizenes. In the case of cylindrical towers, these are necessary when the carpentry is not arranged so that each rafter is trussed. The method of trussed rafters being nearly always adopted in the carpentry of roofs of the middle ages, it is rare to have recourse to lizenes. Since the 15 th century they have been employed for ecclesiastical carpentry forming a dome.

LIGNUM. Spring of Square. Dome.

An inclined timber that supports the ends of a series at one end occurs the wall (arch. Secular). Some stones are being employed in the ecclesiastic of the middle ages, the w rinding steps in shape of square or rectangular plans being always supported on arches, this is much more stable than the system of masonry spirals.

LITOCTA. Tinted. Tasted.

[illegible] a
furnace or ordinary case to receive the rafters of the roof.

LAPIDIV. Limestone.

A block of stone laid on the jambs of a door or window to [illegible]
that fulfils the same purpose is also termed lintel. (Arts. [illegible]

[illegible]

LIT. Bed.

[illegible] a
is constructed between two beds, the upper and lower beds; usually the upper bed of the stone receives the lower bed of the one next above. The Greeks set their generals dressed w ith lay joints, marble or stone, and without mortar. In ecclesiastic masonry the Romans lit the same, and used with good cement-

wood connecting at their base two kingposts lengthwise the roof, to receive the boists of the false floors. They are also curved timbers placed horizontally between the principals of a conical rsof, and which serve to receive the rafters, when these are to be spaced at nearly equal distances in the height of the roof. The timbers A (2) are liernes. In the roofs of cylindrical towers, these are necessary when the carpentry is not arranged so that each refter is trussed. The method of trussed rafters being nearly always adopted in the carpentry of roofs of the middle ages, it is rare to have recourse to liernes. Since the 1i th centurw they have been employed for spheroidal carpentry forming a dome.

LIMON. String of Stairs. Horse.

An inclined timber that supports the steps of a stairs at the end opposite the wall (Art. Escalier). Stone strings not being employed in the architecture of the middle ages, the w winding steps in stairs of square or rectangular plans being always supported on arches, this is much more stable than the system of masonry strings.

LINCOIR. Lintel. Header.

A carpentry term. Wooden timber placed horizontally over d dormers or chimney caps to receive the rafters of the roof.

LINTEAU. Lintel.

A block of stone laid on the jambs of a dosr or window to form the upper part. In carpentry a horizontal wooden timber that fulfils the same purpose is also termed lintel. (Arts. Fenetre, Porte.

LIS, FLEUR DE. Fleur-de-Lis. Art. Flore.

LIT. Bed.

Horizontal setting surface of a cut stone. Each cut stone is comprised between two beds, the upper and lower beds; naturally the upper bed of the stone receives the lower bed of the one next above. The Greeks set their materials dressed w with dry joints, marble or stone, and without mortar. In great masonry the Romans did the same, and that with such perfec-

perlaction, such in Greek and Roman structures built of ashlar or stone or marble, one scarcely perceives the joints between the blocks. This method was sometimes imitated during the middle ages, particularly in countries where there existed a local model of antique monuments, as in Provence and Lombardy; but the imitation is very far from attaining the perfection of the antique architecture in respect to the bond. In the provinces of the Centre and North of France modern use usually demands squared stones from the Versailleian epoch. The beds of mortar are very thick from the 7 to 8 to the 12 to centuries; [illegible] varying from 0.4 to 1.2 ins in the 13 to century. Walls were erected about religious edifices, castles and palaces: they have again become thinner during the 14 to and 15 to centuries, but always retaining a maximum thickness of 0.4 in. As for the old ones, they are plain, well dressed and without holes from the 12 to to the 16 to centuries. In the structures of the Middle Ages the two faces [illegible] as the faces.

[illegible] vertical instead of being horizontal. Lunettes are formed by a [illegible] of Gothic, Italian architect, and long [illegible] are have not been accurately measured generally, they seem [illegible] accurate. It is even important to set stress on their accurate beds, i.e., conformably to their geological positions. Yet in the domain and the constructions of the middle ages did not [illegible] they chose with care those, that could assure that position [illegible].

[illegible]

[illegible] vous edifices, [illegible] the constructed ground and consists [illegible] to the exterior without glass or permanent emplacement. The lunette partly resembles the portico, partly the gallery. [illegible] it is necessary to distinguish it from those two architectural members. The lunette differs from the portico because it is raised above the public street, possesses a sensual [illegible] and its length is limited, while the portico is covered-

perfection, that in Greek and Roman structures built of cut stone or marble, one scarcely perceives the joint between the blocks. This method was sometimes imitated during the middle ages, particularly in countries where there existed a great number of antique monuments, as in Provence and Languedoc; but the imitation is very far from attaining the perfection of the antique stonecutting in regard to the beds. In the provinces of the Centre and North of France mortar was employed between jointed stones from the Merovingian epoch. The beds of mortar are very thick from the 7 th to the 12 th centuries; they became thinner and regular at that epoch, receiving a t thickness varying from 0.4 to 1.2 ins in the 13 th century, when were erected great religious edifices, castles and palaces; they they again became thinner during the 14 th and 15 th centuries, but always retaining a maximum thickness of 0.4 in. As for the cut beds, they are plane, well dressed and without holes from the 12 th to the 16 th centuries. In the structures of the middle ages the beds are dressed with as much care as the faces.

Men call the stone set on edge, when the quarry bed is vertical instead of being horizontal. Limestones are formed by a series of deposits, marine, lake or river, and thus consist af superposed more or less homogeneous layers. When these layers have not been strongly cemented naturally, they tend to separate. It is then important to set stones on their quarry beds, i.e., conformably to their geological positions. Yet t the Romans and the constructors of the middle ages did not commit a fault in employing limestones set on edge, but then they chose with care those, that could assume that position without danger. (Arts. Construction, Joint).

LOGE. Loggia. Bay Window.

A room or portion of a gallery belonging to a public or private edifice, raised above the external ground and opening w widely to the exterior without glass or permanent enclosure. The loggia partly resembles the portico, partly the gallery, still it is necessary to distinguish it from those two architectural members. The loggia differs from the portico because it is raised above the public street, possesses a special entrance, and its length is limited, while the portico is cover-

covered out of transparentes lenses. The lenses belonged to glasses suffer from the accepted gallery in the innocents co-
[illegible]. Glass tubes is accident by glass wagons of problems, and
[illegible] to has cosmo an annex consisting on the photo stocks.
The former accessories of the middle area accessory accessory
the lenses excess in the accessory provinces, where is one pure
a second motive. In one climates, one always prefers an one-
used room to those main used so all winds, so common in an
Italian orders of the 19 in and 14 in centuries. Italian mun-
icipalities frequently accepted those surfaces suitable for access-
ness of visitors, covered by vaults or wooden ceilings to a
avoid the rays of the sun. In those lenses the meronimes use
or work of water effects, as today in schools and clubs. O
the period concave a tree in France the palaces, that corres-
pond to the great lenses of Italy, more as analogs for side
[illegible] of walls; specifics such were only main more or less
[illegible]. Also likewise in one houses in was also to find under
the roofs some lenses, that cables cases to be used as
the tops of Italian decorations, and that are arranged for in
[illegible]. In one [illegible] are any ac-
cidently contained from one modern decorations. There still
exists a few years ago on the edges of the cathedral of
[illegible] a small lenses of the 19 in century, formerly belonging
to his church, that commanded a lenses at the head of the
roof, covered with a red roof and supported at the corners by
columns.

Fig. 1 gives a perspective of the frame of that roof. As
the edge of the roof and respect was constructed in wood a l
[illegible], that return to the six gate mills, and then passes
[illegible] the roof. It was like the reflective gallery with its m
[illegible] lenses.

Fig. 2 presents at A the plan of the frame of the roof,
of the room behind the lenses, and at B the plan of that
lenses. The adjoining lenses of the roof have the name of
"Bolsena", (now Bolsena), like the roofs themselves. They
serve for windows, permit enter all that passes outside, and
allow to excellent varied prose for the commerce. Also that
those have galleries are low, well ventilated and closed at the
ends.

In the vicinity of the marble-glasses were also sometimes ex-

covered and of indeterminate length. The loggias belonging to houses differ from the corbelled gallery in the important point, that this is enclosed by glass sashes or shutters, and adds to the rooms an annex projecting on the public street. The French architecture of the middle ages scarcely accepts the loggia except in the southern provinces, where it can have a certain utility. In our climates, one always prefers an enclosed room to those halls open to all winds, so common in th Italian cities of the 13 th and 14 th centuries. Italian municipalities freely erected those edifices suitable for assemblages of citizens, covered by vaults or wooden ceilings, to a avoid the rays of the sun. In those loggias the merchants came ti talk of their affairs, as today in exchanges and clubs. O One readily conceives that in France the parlors, that correspond to the great loggias of Italy, must be enclosed for nine months of twelve; therefore they were only halls more or less vast. Also likewise in our houses it was rare to find under the roofs those loggias, that custom causes to be opened at the tops of Italian habitations, and that are arranged for br breathing the cool air of evening. Yet the loggia was not absolutely banished from our northern habitations. There still existed a few years since on the square of the cathedral of Laon a small house of the 13 th century, formerly belonging to the chapter, that possessed a loggia at the base of its roof, arranged with a shed roof and stopped at the corners by turrets.

Fig. 1 gives a perspective of the facade of that house. At the base of the roof and recessed was constructed in wood a l loggia, that returns to the two eave walls, and then passes under the roof. It was like the defensive gallery with its wa watch towers.

Fig. 2 presents at A the plan of the facade of the house, of the story beneath the loggia, and at B the plan of that loggia. The adjoining loggias of the roof take the name of "soliers",(eave galleries), like the roofs themselves; they serve for defense, permit seeing all that passes outside, and afford an excellent drying place for the occupants. Note that those eave galleries are low, well sheltered and closed at the ends.

In the vicinity of the market-places were also sometimes es-

[illegible] lattices overlaid the trellis above the ground of the public street between several houses to allow the women to converse; their children under shelter from sun and rain. These small arches at view a small loggia of that kind arrangement bounded a course of the 14 to century. Nothing is simpler than these sequences (2), which consists of two piers and two stone columns resting on a low w-ll; with a vaulted arch and a more close placed as much and next the public street. The facade of the house is of half timber work filled in with brick and resting on the piers and columns, so that this loggia is a projected out a raised corbels with a low wall between its columns.

In the facades of city halls, palaces, mansions of wealthy private men, sometimes houses very rarely in France, are loggias attached like projecting bay windows, i.e., supported on [illegible], are only covered balconies. They were less rare in the provinces of the East and Germanic than in Ile-de-France, the provinces of the West and Germanic. Some houses of Dijon f formerly possessed them; they were found at Metz, Verdun and in the cradle of the Rhine, as proved by numerous engravings of the 16 to and 17 to centuries. These corbelled loggias or [illegible] open bay windows, were placed over the doors of [illegible] in the second story, and formed a sort of roof over the entrance.

In five (4) one of these that we found very well in a French manuscript of the 15 th century in the library of Munich. It was entirely made of wood, covered by lead, and placed over [illegible].

[illegible] was in Italy at the end of the 15 th century imported [illegible] from a [illegible] for loggias; but the architects of the Quattrocento of the Renaissance, who restored the antique [illegible] of the art of our country, [illegible] with difficulty to give them the appearance of a structure open at these sides; they never tested them so low proportion of reduced length, [illegible] only in [illegible].

At the top of the gallery of the Tarcus the Chambre in Paris, there was once a vestibule without glass, that could well pass for a loggia (see. [illegible], Fig. 3). [illegible] consisted of two bays opening on the court of the S. Gum-

established loggaias elevated but little above the ground of the public street beneath several houses to allow the merchants to conduct their affairs under shelter from sun and rain. There still exists at Vire a small loggia of that kind arranged beneath a house of the 14 th century. Nothing is simpler than that structure (3), which consists of two piers and two stone columns resting on a low wall; with a paved area and s some steps placed at each end next the public street. The facade of the house is of half timber work filled in with brick and rests on the piers and columns, so that this loggia is n nothing but a raised portico with a low wall beneath its columns.

On the facades of city halls, palaces, mansions of wealthy private men, sometimes though very rarely in France, are loggias arranged like projecting bay windows, i.e., supported on corbels. By their small dimensions these loggias, properly speaking, are only covered balconies. They were less rare in the provinces of the East and Southeast, than in Ile-de-France, the provinces of the West and Centre. Some houses of Dijon f formerly possessed them; they were found at Metz, Verdun and on the banks of the Rhine, as proved by numerous engravings of the 16 th and 17 th centuries. These corbelled loggias or rather open bay windows, were placed over the doors of houses in the second story, thus forming a sort of hood over the entrance.

We give (4) one of these that we found very well in a French manuscript of the 15 th century in the library of Munich. It was entirely made of stone, covered by lead, and placed over the doorway.

The wars in Italy at the end of the 15 th century inspired French lords with a taste for loggias; but the architects of the beginning of the Renaissance, who retained the sensible traditions of the art of our country, decided with difficulty to give them the appearance of a structure open at three sides; they rather treated them as low porticos of reduced length, opening only in front.

At the top of the stairway of the Chambre des Comptes in P paris, there was thus a vestibule without glass, that could well pass for a loggia (Art. Escalier, Fig. 3). That vestibule consisted of two bays opening on the court of the S. Chap-

[illegible]; the scenes were written since like those of the sa-
[illegible], and were flanked by buttresses decorated by swallows.[1]
The lodia, a first vestibule of the cenacle, was very rich,
as one can judge by our fig. 5, which gives an external over-
[illegible]. Below in the ogival arch was the doorway of the l
[illegible] of the first building and of the recesses of face. The
[illegible] covered landing that we give here as a lodia took the
place of the little [illegible]. We possess an [illegible] a [illegible]
[illegible] very remarkable by the style of its architecture, and
[illegible] was treated in the style of the Italian lozenge, the mon-
[illegible] made into the Palladian of the Tuscans. That lodia con-
[illegible] of three arches, two in front and one in ceiling; in the
[illegible], below the arch in relief, on the cornice was a
[illegible]. Fulmerada were found between the [illegible].[2] The lod-
[illegible] of the Pinacoth of Tuscanella was erected at the corner of
the [illegible] and of the [illegible]. Pierre Lescot was the archi-
[illegible] who [illegible] the cenacle. In 1725 it was taken down
by [illegible], and it was made the monument that we have seen pre-
[illegible] recently demolished, a monument to which it is now diffi-
cult to assign a meaning, for one does not understand well w
[illegible] the idea of placing a flowing fountain at 12.7 or
14.2 fr. rise above the ground. And any mean placing it so h
[illegible], it was indeed necessary to have it flow because a [illegible],
under shelter from the rain. The [illegible] a covered fountain,
[illegible] in reach of passers, but a jet of water [illegible] a
[illegible] of [illegible] certainly has no need of so [illegible]. Ret-
[illegible] all, the [illegible] analogues of the monument remain to us,
and those would be a bad place in complaining of the strange
[illegible] suffered by the architecture of Pierre Lescot.

Note 1.p.126. See the works of Israel Sylvestre, Merlon, & and in the Topog. de la France, Ile. Ethery, the great drawings of the Fonds of the Chambre des Comptes.

Note 2.p.126. See the works of Israel Sylvestre.

[illegible]. Corner of Lucrezia Tridom.

An opening made in the slope of a roof, destined to light the [illegible]. During the [illegible] were made wide [illegible] as [illegible], [illegible] being entirely of wood, vitrails or covered by leaf or slate. Corners however were adorned only from the [illegible]

Chapelle; its arches were without glass like those of the stairway, and were flanked by buttresses decorated by statues.[1] The loggia, a first vestibule of the chamber, was very rich, as one can judge by our Fig. 5, which gives an external perspective. Below in the ground story was the doorway of the l lodging of the first bailiff and of the receives of fees. The great covered landing that we give here as a loggia took the place of the little waiting hall. We possess at Paris a monument very remarkable by the style of its architecture, and that was treated in the style of the Italian loggias, the monument made into the fountain of the Innocents. That loggia consists of three arches, two in front and one in return; In the substructure, below the arch in return, on the outside was a fountain. Balustrades were found between the piers.[2] The loggia of the fountain of Innocents was erected at the corner of Rue S. Denis and of Rue aux Fers. Pierre Lescot was the architect and Jean Goujon the sculptor. In 1785 it was taken down by pieces, and it was made the monument that we have seen restored recently somewhat, a monument to which it is now difficult to assign a meaning, for one does not understand well w why men had the idea of placing a flowing fountain at 19.7 or 26.3 ft. high above the ground, and why when placing it so h high, it was judged necessary to have it flow beneath a dome, under shelter from the rain. One accepts a covered fountain, if it be in reach of passers, but a jet of water crowning a pyramid of basins certainly has no need of an umbrella. After all, the charming sculptures of the monument remain to us, and there would be a bad grace in complaining of the strange transformations suffered by the architecture of Pierre Lescot.

Note 1.p.185. See the works of Israel Sylvestre, Merion, & and in the Topog. de la France, Imp. Library, the great drawings of the facade of the Chambre des Comptes.

Note 2.p.185. See the works of Israel Sylvestre.

LUCARNE. Dormer or Lathern Window.

An opening made in the slope of a roof, destined to light the attic. During the middle ages dormers were made with stone fronts, others being entirely of wood, visible or covered by lead or slates. Dormers however were adopted only when the roofs had assumed great importance. During the Romanesque pe-

period, the carpentry of the roofs being generally flat, there was no opportunity to light them by dormers, since lodgings could not be arranged there; but from the 13 th century habitations were crowned by roofs forming at least an equilateral triangle in section; the lower part of those roofs was utilized by constructing these chambers lighted anf vaulted by domes. Later was given the name of mansards to these windows,(?), and to Mansart has been given the honor of regarding him as t the inventor of these openings, which existed on all public and private buildings in the North long before him.

We shall first occupy ourselves with dormers whose stone f fronts rest on the cornice in the plane of the wall. The 13 th, 14 th and 15 th centuries furnish us with a great number of examples of this kind of openings, composed of two jambs with sill and a lintel terminated by a gable and a tympanum. These dormers with stone fronts are generally too high for a person to approach easily and look out into the street; their openings are even fitted with a transom bar of stone, as in the example given here (1).[1] The jambs are abutted by two buttresses that give them a bearing on the top of the wall; little gargoyles extend around these buttresses and cast the water from the v valleys into the gutter A existing between the dormers and f furnished with great gargoyles. The lintel of one stone bears with it the two little side gables. A second block of stone f forms the apex. The copings of the gable have drips before a and behind, so as to cover the slate roof B of the dormer. Re Reveals are recessed on the jambs; this kind of dormer is common in the 13 th century. Sometimes, though rarely at that i epoch, the tympanums are decorated and the copings have crockets. Yet these crownings of edifices, outlined on the roofs, do not delay in receiving a very rich ornamentation. It was customa y during the second half of the 13 th century and u until the 16 th to place great halls beneath the roofs. These ceiled halls could only be lighted by very high dormers extending down to the internal floor placed below the external cornice, and interrupting that. The carpentry was composed only of trussed rafters, whose collar beams were fastened to the principals extending down to the blocks.(Art. Charpente, Fig. 26). The importance of these dormers (Luthern) required particular care in their construction, for it was necessary that

more among people could support themselves, then they should secure the conveniences of the scrivenery, and all lacks of whatever should be avoided between the stone and the roofing. According to the customs of building by the architects of the middle ages, there considerations relating to the stability of the convergencies of the very different materials are nicely observed. We have in our sites replaced this case in the study of details by quite rule means, soon as diverse foreign and also inventions; but also it is necessary to continually seek the roofers to provide the principle defects of the body ever-lien conservation, or at least in order to fasten the rock in a colerable manner, so have the masons fallow the roofers several times at these delicate points, the roofers the masons also at several times. To those old times of ignorance, when the mason had fitrained his work, there were the carpenter and then the roofer: each found matters so arranged as to not have to repair when the last slates and lath coverings were placed. Fig. 2 shows one of those frame formers of called roofs. As a we give the horizontal section made at the level a b of the face 2. The course of the building with its gutter is at M; the floor of the corner is shaded laterally by the buttress F and behind by the pilasters 3, aligned which are attached the secondary walls. Little channels 4 collect the water from the roof, then runs along these pipes to fall into the gutters (see side elevation D). On the sides I set on the side walls (see rear elevation C) are fastened the timbers forming the rafters and receiving the lateral ceiling so as not to cover the wooden K, the rectangular beams also bearing. Frames of this kind existed on the palace at Paris, on the structures of the beginning of the 14 th century, on the chalet vont-arses, Gally, Gonzy, and Pierefonds (remnants of 15 th cen-tury). But that [illegible] [illegible] of the-still-is and ans of the 15 th century are very common.

Note 1.p.129. From a house of Renaudis of the 13 th century, now destroyed.

In certain provinces of France, like Brittany, Picardy and Normandy, there was a custom during the 14 th and 15 th cen-turies, of giving to certain country buildings and buildings of possible a low height, covering them by enormous roofs. For although these buildings were single in width, they sometimes

their stone fronts could support themselves, that they should receive the penetrations of the carpentry, and all leaks of rainwater should be avoided between the stone and the roofing. According to the customs of building by the architects of the middle ages, these precautions relating to the stability of t the construction of the very different materials are minutely observed. We have in our time replaced this care in the study of details by quite rude means, such as plaster furrings and zinc junctions; but also it is necessary to continually send the roofers to repais the primitive defects of the badly studied construction, or at least in order to finish the work in a tolerable manner, to have the masons follow the roofers several times at these delicate points, the roofers the masons also at several times. In those old times of ignorance, when the mason had finished his work, there came the carpenter and then the roofers; each found matters so arranged as to not have to return when the last slate and last cresting were placed. Fig. 2 shows one of those great dormers of ceiled roofs. At A we give its horizontal section made at the level a b of the face B. The cornice of the building with its gutter is at E; the front of the dormer is abutted laterally by the buttress F and behind by the pilasters G, against which are attached the carpentry sides. Little channels H collect the water from the roof, that runs along those sides to fall into the gutters (see side elevation D). On the paltes I set on the side walls (see rear elevation C) are fastened the timbers forming the rafters and receiving the internal ceiling so as not to cover the transom K, the rectangular sashes alone opening. Dormers of this kind existed on the palace at Paris, on the structures of the beginning of the 14 th century, on the castlesof Montargis, Sully, Coucy, and Pierrefonds (beginning of 15 th century), and many other palaces and castles. Those of the middle and end of the 1½ th century are very common.

Note 1.p.186. From a house of Beauvais of the 18 th century, now destroyed.

In certain provinces of France, like Brittany, Picardy and Normandy, there was a custom during the 14 th and 15 th centuries, of giving to certain country buildings and buildings of castles a low height, crowning them by enormous roofs, for although these buildings were single in width, they sometimes

and a clear width up to 22.5 and 26.0 ft.; now the roof being drawn as an unilateral triangle, it is understood that the ridge must rise much above the cornice. Those buildings in so ancient were then arranged in this manner (2):-1, a cellar story A; 2, a ground story B; 3, a second story C, half mezzanine; 4, a story D in the middle of the roof and the attic; thus the windows of the second story C already were dormers and only formed a part of them. We have a very beautiful example of this sort of construction in the castle of Chaseaiyn in Britany, (4), whose construction dates from the last years of the 15 th century. There the ridge of the dormers is on a level with the ridge of the roof; their fronts are decorated by sculpture, monograms, devices and arms; the openings are wide, furnished with mullions and transom bars, with sashes flanked by pinnacles. The balustrade is placed on the edge of a gutter carrying the water thrown a particle between the dormers. In the upper mansard story the dormers form a kind of roll lighted recesses. In which one could remain to work or to enjoy the view of the country. The pilasters [illegible] more to the facades of buildings and the constructors to give them increasing importance; they sometimes became the principal part of the decoration, about the end of the 15 th and the beginning of the 16 th centuries, as one can still see on the palace of Justice of Rouen, where it seems as if the facades are only made for dormers, since their construction shows forward of the court. In more modest proportions beautiful dormers of the [illegible] are still seen as the models of Tours as Paris, [illegible] of Tours; on houses of Tours, Bourges, Orleans and Caen' on the city hall of Rouen, etc. The dormers of the castle of Chaseaiyn, like those of the palace of Justice of Rouen, are actual bodies making roofs penetrating the principal roof as right angles. In this case they can serve to pierce the thrust of the carpentry, when this is without tirecers at its base, or at least they break this thrust on the wave walls at certain distances, and give those walls great stability by their weight.

Dormers of carpentry, small and modest during the 13 th and 14 th centuries, likewise assumes more importance during the [illegible]

had a clear width up to 32.8 and 36.0 ft.;now the roof being drawn as an equilateral triangle, it is understood that the ridge must rise much above the cornice. Those buildings in se section were then arranged in this manner (3);:-1, a cellar story A; 2, a ground story B; 3, a second story C, half mansard; 4, a story D in the middle of the roof and the attic; thus the windows of the second story C already were dormers and only formed a part of them. We have a very beautiful example of this sort of construction in the castle of Josselyn in Brittany, (4), whose construction dates from the last years of the 15 th century. There the ridge of the dormers is on a level with the ridge of the roof; their fronts are decorated by sculptures, monograms, devices and arms; the openings are wide, furnished with mullions and transom bars, high gables flanked by pinnacles. The balustrade is paleed on the edge of a gutter casting its water through a gargoyle between the dormers. In the upper mansard story the dormers form a kind of well lighted recesses, in which one could remain to work or to enjoy the view of the country. The picturesque appearance given by these great dormers to the facades of buildings led the constructors to give them increasing importance; they sometimes became the principal part of the decoration, about the end of the 15 th and the beginning of the 16 th centuries, as one can still see on the palace of justice of Rouen, where it seems as if the facades are only made for dormers, since their composition starts from the ground of the court. In more modest proportions beautiful dormers of the beginniug of the 16 th century are still seen at the mansion of Cluny at Paris, and the city hall of Compiegne; on houses of Tours, Bourges, Orleans and Caen; on the city hall of Saumur, etc. The dormers of the castle of Josselyn, like those of the palace of justice of Rouen, are actual gables maskiug roofs penetrating the principal roof at right angles. In this case they can serve to resist the thrust of the carpentry, when this is without tiebeams at its base, or at least they break this thrust on the eave walls at certain distances, and give those walls great stability by their weight.

Dormers of carpentry, small and modest during the 13 th and 14 th centuries, likewise assumeed much importance during the 15 th century; like dormers with stone fronts, they only appear in the architecture of the middle ages at the moment when roofs

cases go to 75°, and at Laon are fixed as a slope of 45° dressers. Upon they are see, not on the nave vaults of whole roofs, but on lower rafters to lines are avoids. They are always well concerned as carpentry and are graceful in form, contrary to what is produced today.

The oldest wooden horses known to us, properly speaking, not made from vertical members but rafter and tiers in system, but that cannot receive glazed sash; they are out in coarse woodwork and are covered by tiles, slates or lead. They existed on the beams roof of the cathedral of Chartres, that dated from the 12 century. Here (5) is their construction: two h posters A formed a rectangular opening supporting two spaces between rafters. On the rafters B were put two triangles D receiving the front E on their ends, and small ties with rafters F. Second oak planks were nailed on those rafters and connected them with the front; on these planks was placed the lead, which formed a collar on the front and at the sides, as indicated by the detail C. Other spaces of lead covered the 5.5 × 2.5 ins. and carefully out.

However, some spaces in the (1) A vertical parameter were of very great dimensions, sometimes divided in two openings by a mullion. The roofs of the cathedral at Autun have retained some that date from the end of the 12 century and are of quite beautiful form (6): the most of those horses always remains visible and is sometimes by a strongly projecting eave roof. These horses were made to be closed below the lintel by shutter with glass and opening inside; the glass remains open.

The church of Notre Dame of Châlons-sur-Marne can retained on the rio of the apse a pretty dormer covered by lead with terminal and weathercock (7). One still sees on the apse roofs of the cathedral of Reims dormers, that date from the 15 to century, but which are now disfigured by numerous restorations. These dormers are crowned by terminals like that of Notre Dame of Châlons. Then pressed at half timber, most of very if is nowadays, wooden frames are not tables but eave walls, are surrounded by very beautiful dormers. In the work of M. Verrier and others on Arch. ary. et dom., we mention more, possibly those of the hospital of Beaune and that of a house at Dijon. The

cease to be flat, and at least are drawn at a slope of 45° degrees. Then they are set, not on the eave walls of those roofs, but on their rafters to light the attics. They are always well combined as carpentry and are graceful in form, contrary to what is practised today.

The oldest wooden dormers known to us, properly speaking, are only large attic openings to give air and light in attics, but that cannot receive glazed sash; they are cut in coarse woodwork and are covered by tiles, slates or lead. They existed on the burned roof of the cathedral of Chartres, that dated from the 13 th century. Here (5) is their construction; two h headers A formed a rectangular opening occupying two spaces between rafters. On the rafters B were set two triangles D re-receiving the front E on their ends, and small ties with rafters F. Strong oak planks were nailed on those rafters and c connected them with the front; on these planks was placed the lead, which formed a collar on the front and at the sides, as indicated by the detail G. Other sheets of lead covered the front and sides, including their thickness. The timbers were 5.9 × 9.8 ins. and carefully cut.

However, one sees appear in the 14 th century carpentry dormers of very great dimensions, sometimes divided in two openings by a mullion. The roofs of the cathedral at Autun have retained some that date from the end of the 14 th century and are of quite beautiful form (6); the wood of those dormers always remains visible and is sheltered by a strongly projecting tile roof. These dormers were made to be closed below the lintel by shutter with glass and opening inside; the gable remains open.

The church of Notre Dame of Chalons-sur-Marne has retained on the hip of the apse a pretty dormer covered by lead with terminal and weathercock (7). One still sees on the great roofs of the cathedral of Rheims dormers, that date from the 15 th century, but which are now disfigured by numerous restorations. These dormers are crowned by terminals like that of Notre Dame of Chalons. Some houses of half timber work of the 15 th century, whose facades are not gables but eave walls, are surmounted by very beautiful dormers. In the work of MM. Verdier and cattois on Arch. civ. et dom., we mention some, notably those of the hospital of Beaune and that of a house at Lisieux. The

The architects of the 15 th century have conceived adopted the conservation of dormers of carpentry, an arrangement of stone dormers mentioned above at the church of Assezat, i.e., [illegible] under the roof, in stone.

We give (8) a dormer erected on this station, and then comes from a house of Villemur. At A we present the elevation and at B the section. Here the wood is visible below the sand C, that is covered by slates. The lead covers only the terminal and the ridge. The roofs and sides are also covered by slates. Glazed arches close the openings.

If one consults the old painted and engraved views made of the castles and palaces of the middle ages, one sees that the dormers filled an important place in these residences, since the roofs contained many lodgings. Considered as at the castle of Pierrefonds, dormers of stone or wood and combined with the crenelations of the inner gallery, were reserved to light halls placed behind those external casemates. Their fronts then rest on the wall of the gallery, the light penetrating their covering reaches the wall by an opening pierced in the dormer wall.

It is certain that the architects of the middle ages, contrary to what is generally conceived today, devoted minute care to the study of all parts of the roofs, both from the point of view of solidity, and good construction, and of art. For them to properly crown an edifice was the important matter, and they did not think that the part of the architect ceased at the top of the cornice. The construction of dormers must necessarily fix their attention, since these ingenuent parts of the roof are detached against the sky, and thus contribute to the monumental appearance of the edifice. Desiring to mark a stage, that this construction was neglected during the 16 th and 17 th centuries; for many castles of the Renaissance from the time of Henry IV and of Louis XIII have remained dormers [illegible] with care, often very richly decorated by sculptures [illegible] of the facades.

[illegible]

a great case, for the passage of carts.

The architects of the 15 th century have sometimes adopted for the construction of dormers of carpentry, an arrangement of stone dormers mentioned above at the castle of Josselyn, i.e., they were set on the top of the great wall and lighting a story under the roof, an attic.

We give (8) a dormer erected on this system, and that comes from a house of Gallardon. At A we present the elevation and at B the section. Here the wood is visible below the band C, that is covered by slates. The lead covers only the terminal and the ridge. The roofs and sides are also covered by slates. Glazed sashes close the openings.

If one consults the old painted and engraved views made of the castles and palaces of the middle ages, one sees that the dormers filled an important place in these habitations, since the roofs contained many lodgings. Sometimes as at the castle of Pierrefonds, dormers of stone or wood and combined with the cremelations of the inner gallery, were destined to light halls placed behind those external passages. Their fronts then rest on the wall of the gallery,the light penetrating their covering reaches the hall by an opening pierced in the great wall.

It is certain tha the architects of the middle ages,contrary to what is generally practised today, devoted minute care to the study of all parts of the roofs, both from the point of view of stability, and good construction, and of art. For them to properly crown an edifice was the important matter, a and they did not think that the part of the architect ceased at the top of the cornice. The composition of dormers must necessarily fix their attention, since these important parts of the roof are detached against the sky, and thus contribute to the monumental appearance of the edifices. Besides we must s state, that this tradition was maintained during the 16 th a and 17 th centuries; for many chateaus of the Renaissance from the time of Henry IV and of Louis XIII have retained dormers designed with care, often very richly decorated by sculptures and statues, occupying the greatest place in the arrangement of the facades.

LUNETTE. Circular Opening.

A round opening placed at the middle of a cross vault like a great boss,for the passage of pells.

MACHICOULIS. Machicalation.

Square or oblong openings made horizontally along the defensive gallery or a tower or curtain, allowing men to defeud the foot by dropping stones or burning materials. Machicolations existed in the wooden galleries built on the ramparts en the first times of the middle ages and until the 13 th century. (Art. Hourd). But these galleries were frequently burned by the besiegers, and they were replaced about the end of the 13 th century by inside galleries of stone corbelled out at the tops of the walls and towers, and pierced by holes close together through which were dropped on the assailants materials of all kinds, boiling water, hot pitch, etc. We have seen in Art. Hourd, how already at the castle of Coucy, i.e., at the beginning of the 13 th century the projecting beams of the g galleries were replaced by stone corbels. Yet after that epoch were established actual stone machicolations at the tops of some edifices, notably on one of the dependances of the cathedral of Puy-en-Velay, an addition that dates back to the 12 th century. That beautiful building, known in the country by the name of the building with machicolations, merits very particular attention, for it is one of the most remarkable military structures that we possessed in France, an important and substantial defense placed over a great hall with pointed tunnel vault, a defense that can contain 200 men and cover with projectiles the entire south side of the cathedral, between that and the rock of Corneille. That was like an advanced work for the castle, which crowned that rock, stopping the assailants at the sole point at which it was approachable, and absolutely masking the cloister and its dependances. At the origin, i.e., in the 12 th century, the great hall that long served as the hall of the provincial state was covered directly on the tunnel vault by double slopes of tiles set in mortar. In the 13 th century this hall was surmounted by a defense, w whose plan we give here (1). This defense was reached only by a narrow passage communicating with the door A. Before the buttresses B open machicolations C; other machicolations D defend the face of the wall between these buttresser. Piers E are p placed on the buttresses behind the machicolations, and other piers F built on the wall toward the cloister bear plates on which rest the trusses, that support the covering which shelters

the entire area of the building. At the ends are tablets.

The inscription reading left to right (between pilasters) seven feet of the above, at B are the dedicatees. The area the accessories of the mortuary-cone, whose beginning C are borne on wooden rectangles on the corbels. A cornice D crosses the interior from arches such from outside. Floors are placed in the walls of the crenellies and doc in the meloons, as indicated in the plan and section. By the arrangement of the plate a balance was entirely unnecessary of the entrance. The external face of the cenotaphs is given in fig. E. The mausoleum rests upon solidly built by means of arches burned on corbelled courses. The cobbe the interesting consequence of the dual mausoleations between the cotteqeas, whose twin arches are accounted by a transacting arch that relieves the middle vessel. At each brutness the rafters of the consequency protect so as to shelter the small mausoleiaicos. That entire structure is made of free cut stone and lime, and is seems to date from vespecency. Its crescent effect is striking. These mausoleiaicos in the form of large coins commonly placed to the northern provinces, and they preceded by nearly a century the mausoleiaicos of the North, which consist of a series of arches mausoleiaicos in form of load holes in the defences of the in so consecry, belonging to the ancestral of Sorrere.

The mausoleiaicos of the great wall of Ray are further not the only cases of such kind found in Syrerica. The course of Syrea near Diarrot is covered by mausoleiaicos, whose style of construction meets early. Then the accessoes circled with dressed marlecy works did not believe been melinas and a variety of forms was one of the constrtiere imposed by a processes under a present of sacrificing all to utility. Persons

rely every road and even to vindicate them, the artist knew how to close the eyes by the effective and then study of the least details. Certainly in works intended for the defense of a place or a cons, the not interested to sculpture or paint, as with the Romans, mirons consecre on the battlements, indeed to preserve the essentials, one can prefer or are constructions; but when on the contrary, act somers to all recon-

the entire area of the building. At the ends are gables.

The transverse section made on a b (2) indicates at A the great hall of the state, at B are the buttresses. One sees the arrangement of the machicolations, whose battlements C are borne on arches resting on the corbels. A parapet D protects the defenders from arrows shot from outside. Slots are pierced in the walls of the crenelles and not in the merlons, as indicated in the plan and section. By the arrangement of the piers a defense was entirely independent of the carpentry. The external face of the battlements is given in Fig. 8. The machicolations are solidly built by means of arches turned on corbelled courses. One notes the interesting construction of the great machicolations between the buttresses, whose twin arches are surmounted by a discharging arch that relieves the middle corbel. At each buttress the rafters of the carpentry project so as to shelter the small machicolations. That entire structre is made of fine cut stone and lava, and it seems to date from yesterday. Its external effect is striking. These machicolations in the form of large holes especially belong to the southern provinces, and they preceded by nearly a century the machicolations of the North, which consist of a series of square holes arranged between corbels. We shall see at once, m machicolations in form of long holes in the defenses of the 14 th century, belonging to the cathedral of Beziers.

The machicolations of the great hall of Puy are further not the only ones of that kind found in Auvergne. The church of Royat near Clermont is crowned by machicolations, whose style of construction merit study. Then the architects charged with directing military works did not believe that ugliness and c vulgarity of forms was one of the conditions imposed by a programme under a pretext of sacrificing all to utility. Because art entered for something into their composition, these defenses lost nothing of their strength; flexible and ready to satisfy every need and even to vindicate them, the artist knew how to please the eyes by the attentive and true study of the least details. Certainly in works intended for the defense of a place or a post, whe art intervened to sculpture or paint, as with the Chinese, hideous monsters on the battlements, designed to terrorize the assailants, one can smile at its inspirations; but when on the contrary, art submits to all requ-

requirements of the defense, it knows how to give to the least details a beautiful form clearly indicating their purpose; w when it seeks nothing but the most reasonable and solid construction, one can admit that it is well to allow it to take its place. Now it is given to art alone to express by suitable forms all needs, even the most ordinary, and we shall see no inconvenience because in our modern defenses the external appearance corresponds to the reality.[1] To crown a gate today, a barrack or defensive work, by machicolations would be ridiculous; but it is entirely otherwise at least, to give these military works the appearance of a mansion, to surround them by Roman pilasters, to terminate them by cornices profiled a according to the rules of Vignola, and to enclose their openings by architraves borrowed from treatises on architecture f filled with the ideas of dealers in engravings. All the examples of the various parts of the architecture of the middle a ages, that we give in this work show well, that each of those parts exactly fulfils a function, and that one cannot confound a detail of a military edifice with a detail of a civil or religious structure. Each monument retains an appearance peculiar to itself, each detail accords with the part of the programme that required it, and the more the programme tends to i impose a certain form demanded by a definite and imperious need, the more the architecture gives to that form an accented character. We shall have the proof of this once more, if one is willing to follow us in our study of machicolations.

Note 1.p.200. How is it with our casemate barracks, that have the appearance of houses of pasteboadr? Such as they are, we admit that they resist perfectly the effect of bombs; but to see on the exterior their lean construction, one would not credit them with the robust qualities that they possess.

Let us see (4) the arrangement of the machicolations crowning the church of Royat. At A are seen the machicolations in section; they are presented in elevation at B. This construction belongs to the first half of the 13 th century; it consists of a series of arches borne on corbels. Between the buttresses of the edifice are counted four arches. The architect understood that the angles and still more the the fronts needed to be pr protected by machicolations, and has adopted an arrangement of corbels C that allow the merlons to follow their planes,

and some large or even small a large square mastoidation.
The usual of one corners is crossed in Fig. 5, the profile of
a and elevation in 5. The case has much of the effect answer
more, for those corners are carved in one distinct manner. F
but if as concession the provisions of the Verdo, the mastoidation
alone correspondy increase until the end of the 12 on century. The
use in constructive wood and also the strong predecessors of the
fortification-rows of those provinces demanded that land to pe-
rmit the system of defensive buildings. For example, the def-
ensive of Carcassonne, which were erected by Philip the Bold
from 1285, contains present traces of mastoidations, although
they already existed in the provinces of the Centre and South,
and these fortunes were consolidated with a great luxury in d
defensive processions; but mastoidations was then adorned by
vast forces, and the fresques were built by architects from
the Tower.

Among the same season in Gardanda, some limestone is abund-
ant, colourful and solid, we are mastoidations answer. They
already exist on the summit of the tower of the castle of Ro-
[illegible]; but these mastoidations are not continuous, but fo-
rm a work of circulated vaults turned on each front of each s
tower, whose plan is a square accompanied by large out-off and-
iles. These architectural ways relate the fronts and not the
angles. Fa appears at A (2) the plan, and F the inserent, and
in 3 the exact elevation; AB I the section on a o' at E s
[illegible] elevation on c d, and of I the section on g h. These
mastoidations are covered and arrange successively the moment-
ence of a circular region bound in corbels, placed by a mis
in the form of a [illegible]. The sides are front of this lit-
tle corbeaux by the corbeaux of these alone F rs. turn;
the course is made of two arches. The cells in the mastoidat-
ion is merely on the [illegible] of the angles of the castles, so
that it was necessary to light the [illegible], that one desired
no [illegible] or the [illegible]. As for the merlons placed between
these mastoidations, they are occupied by pinnacles, pierced
by slots in the iron fronts and fitted with iron hooks, as a
[illegible] as the slopes of the mastoidations, reserves for hanging
[illegible] arrangements. A perspective in Fig. 7 will illustrate the
[illegible] of such system of defenses. This consequence it [illegible]
[illegible] the [illegible], but [illegible] has not changed. The pinnacles alone

and that leaves to each angle a large square machicolation. The detail of the corbels is traced in Fig. 5, the profile at A and elevation at C. One sees the taste of the artist appear here, for those corbels are curved in the happiest manner. B But if we approach the provinces of the North, the machicolations scarcely appear until the end of the 13 th century. The ease in obtaining wood and also the strong projections of the fortifications of those provinces permitted them long to retain the system of defensive galleries. For example, the defenses of Caracssonne, which were erected by Philip the Bold about 1285, nowhere present traces of machicolations, although they already existed in the provinces of the Centre and South, and these defenses were established with a great luxury in d defensive precautions; but Carcassonne was then surrounded by vast forests, and its ramparts were built by architects from the North.

About the same epoch in Burgundy, where limestone is abundant, beautiful and solid, we see machicolations appear. They already exist on the summit of the tower of the castle of Mo-Montbard; but these machicolations are not continuous, but form a sort of projecting watch turret on each front of that t tower, whose plan is a square terminated by three cut-off angles. These machicolations thus defend the fronts and not the angles. We present at A (6) the plan, at B the internal, and at C the external elevations; at D the section on a b; at E t the side elevation on c d, and at F the section on m n. Those machicolations are covered and present externally the appearance of a projecting merlon borne on corbels, pierced by a hole in the form of a quatrefoil. The sides and front of this little projecting bay are constructed of three slabs 8 ins. thick; the coping is made of two stones. The hole in the machicolation is nearly at the height of the sills of the crenelles, so that it was necessary to lift the projectiles, that one desired to drop on the assailants. As for the merlons placed between these machicolations, they are crowned by pinnacles, pierced by slots in the long fronts and fitted with iron hooks, as w well as the sides of the machicolations, intended for hanging wooden shutters. A perspective in Fig. 7 will illustrate the whole of that system of defense. This construction is made of fine materials, that time has not changed. The pinnacles alone

have been thrown down; we could only conjecture what from tradition.

It is clear that the assailants placed at C at the base of the tower (see the plan, Fig. 6) could scarcely be struck by projectiles falling from these machicolations; but it must be admitted that this tower is built on a precipice of rock, and that the assailants mounted on the roundhead. Yet men did not delay to seek a species of continuous machicolations, that could defend the entire circuit of the ramparts, and these were so easily made arranged with a view of the effects produced by the fall of the projectiles, as this had already been attempted for the defensive palisades.(Art. Hoard). It was also desired for the machicolations to secure the projecting angles, but these improvements were introduced into the art of fortification of places and serves only about the middle of the 14 th century. There are been machicolations of that epoch very well established on the remain of the tower of the castle of Pierrefonds. The plan of that tower, or rather of that tower, (fig. 7), represents a machicolated angle of the covered the exterior of the fortress.

Although this method, however, was considerably improved and is still, still it is covered by the cor of machicolations surrounding the work. In plan (8) the corbels of these machicolations are set aside to from two lines parallel to the point as indicated by the arrow A. The angle then changed by a crenelle perpendicular to the axis and by two tangular holes in the machicolations; it is defended. We represent the perspective view of it at 9. The profile C is made on the axis of an arch of the machicolation. The will come the projection i arranged between the corbels, and thrown is intended to prevent projectiles falling through the holes from rebounding on the roofs surface, that would cause them to receive from the vertical line of fall; nor the vertical line of face the coincidence with these case by the military constructions, and it always strunk the better, that caused these projectiles to describe a certain parabola because of their weight and the orient of the wall. If the assailant came to stay at the foot of the rampart, he could easily protect himself from projectiles falling vertically by means of a small covered by iron and dotted with tow, but it was indeed more

have been thrown down; we could only restore them from fragments.

It is clear that the assailants placed at O at the base of the tower (see the plan, Fig. 6) could scarcely be struck by projectiles falling from these amchicolations; but it must be stated that this tower is built on a precipice of rock, and that the besieged counted on the rebounding. Yet men did not delay to seek a system of continuous machicolations, that could defend the entire extent of the ramparts, and these were at their base arranged with a view of the effects produced by the fall of the projectiles, as that had already been attempted for the defensive galleries.(Art. Hourd). It was also desired for the machicolations to strike the projecting angles. but those improvements were introduced into the art of fortification of places and castles only about the middle of the 14 th century. There are seen machicolations of that epoch w very well established on the summit of the tower of the castle of Beaucaire. The plan of that tower, or rather of that keep, gives this Fig. (8), presenting a projecting angle A t toward the exterior of the fortress.

Although this angle dominates the considerable precipice of rock and is solid, still it is crowned by the row of machicolations surrounding the work. In plan (9) the corbels of these machicolations are set askew to form two lines parallel to t the point as indicated by the sketch A. The angle then dominated by a crenelle perpendicular to its axis and by two triangular holes in the machicolations; it is defended. We present the perspective view of it at B. The profile C is made on the axis of an arch of the machicolation. One will note the projection d arranged beneath the corbels, and which is intended to prevent projectiles falling through the holes from rebounding on the rough surface, that would cause them to deviate from the vertical line of fall; now the vertical line of drop was calculated with great care by the military constructors, and it always struck the batter, that caused these projectiles to describe a certaiu parabola because of theiri weight anf the height of the wall. If the assailant came to stay at the foot of the rampart, he could easily protect himself from projectiles falliug vertically by means of a shield covered by iron and padded with tow, but it was indeed more

[illegible] large masses presented surfaces. To answer the crisis of protection failure against the microbiotics, the besieged took care to leave them. In local areas and week spaces were lack-ing, many groups brought the macrobiotics however came to hand, blocks of wood, tiles, boulders and rubble. But if the place here well covered, occasionally surrounded for defense by the macrobiotics were made of heavy stones, sources of regular firearms; only then could their effect be assured.[1] This is one reason to study the microbiotics, it is at the same time necessary to describe the construction of the lower corner of the walls, for both slope to resources by the gar-ris of lower wall, by the position of the macrobiotics, and by the good for marking a certain point of the enemy, of the assap or surprise. In the fortifications of the 14 to and the [illegible] of the 14 in center ex, the macrobiotics and slopes are [illegible] because to operate a certain effect inspired by the roads of the defense. Fig (10) as A be the section of the above the [illegible] of the ditch G: it is then necessary to pre-[illegible] close ladders, the close forming a sheer angle with the vertical wall, and then the projectiles will be sent far from the point H (foot of the [illegible]) and will fall to the bottom of the ditch in [illegible]. The service the projectile, the more the [illegible] I will approach but [illegible] and drives [illegible]. If the [illegible] the point H, projectiles of [illegible] can [illegible] the. If is fills part of the 3 [illegible] and [illegible] the point L, he will receive the projectile [illegible] Fig.

Fig 1.p.227. It is not to be located that projectiles ins-[illegible] for fortifications were out in advance and were sphert-cal. He hoos found an enormous quantity of those stone balls in structures preceding the use of artillery, and which is st-ill better proof, one frequently sees some, that hoos possib-ed attack on the holes of machicolations too narrow to allow t-hem to pass.

Assuming that [illegible] angle 3 are sufficiently wide to not [illegible] advance, the [illegible] will from the vertical an angle [illegible]

difficult to provide against stones coming obliquely; besides, those shots prevented approaches. To ensure the effect of projectiles falling through the machicolations, the besieged took care to dress them. In long sieges and when stones were lacking, they dropped through the machicolations whatever came to hand, blocks of wood, tiles, boulders and rubble. But if the place were well provided, projectiles suitable for defense by the machicolations were made of heavy stones, spheres of regular diameter; only then could their effect be ensured.[1] Thus if one desires to study the machicolations, it is at the same time necessary to observe the inclination of the lower batter of the walls, for that slope is determined by the height of that wall, by the projection of the machicolations, and by the need for striking a certain point of the ditch, of the scarp or terrace. In the fortifications of the 14 th and the beginning of the 15 th centuries, the machicolations and slopes are combined together to produle a certain effect imposed by the needs of the defense. Let (10) at A be the section of the rampart with machicolations, the rampart being little elevated above the bottom of the ditch G; it is then necessary to prevent the assailant from approaching sufficiently to be able to place ladders, the slope forming a great angle with the vertical wall, and then the projectiles will be sent far from the point H (foot of the batter) and will roll to the bottom of the ditch in rebounding. The heavier the projectile, the more the parabola I K will approach the straight line and diverge from the point H. If the enemy reaches the point H, projectiles of moderate weight can strike him. If he fills part of the d ditch and reaches the point L, he will receive the projectile obliquely with all its force.

Note 1.p.206. It is not to be doubted that projectiles intended for machicolations were cut in advance and were spherical. We have found an enormous quantity of those stone balls in structures preceding the use of artillery, and what is still better proof, one frequently sees some, that have remained stuck in the holes of machicolations too narrow to allow them to pass.

Assuming that the ramparts B are sufficiently high to not fear scaling, the batter will form with the vertical an angle more obtuse, and the projectile will fall obliquely near the

face of the stone. Assuming again that the present is little changed above the contemporary of the stone, but that the is less (D), the batter will be so arranged that the mechanic will swing in for the smaller height at a little distance. If the pescart is built on a prominence of rock (C), the batter will be turned so that the mechanic will fall at the foot of the rock, in order to drive away the sinner. That will occur is to be understood, the importance of having mechanical possibilities of known weight for defending the foot of the ramparts by means of projectiles, according to the nature of the street, and for the section of the batter should be turned according to the nature of the place. Now if we keep taken the effect of mechanics calculable with obeying the angles of batters and the existing of ramparts to obtain certain effects, we can be assured that in the 14 th century the military engineers lavished no less care and calculation in drawing their fortifications, the towers of their castles and all [illegible] of a beautiful overcoat.

Still we have seen in Apt. Nowe, how the wooden tower [illegible] every to-whether the infernus placed in these inner dailieres, behind the castlemente, from projectiles cast interactly by the assailants; men that undertook to cover also the machicolations with shoes, as they had covered the outer dailieres by roofs of cut-stone, but some commonly. The most remarkable machicolations of that kind, that exist in France are a certain class of the castle of Pierrefonds; they date from 1400. We small refuse to them immediately.

[illegible] it is necessary to know of those of the remarks of Aviano, proceed about the middle of the 14 th century, and which ordinant certain contingencies worthy of attention, for example, the course remains on towns, the audie towers, protection machicolations, etc. The machicolations of the remarks of Aviano never been intended to be covered, and being surrounded by simple battlements, to avoid overcrow the consequences have given to the corbels a sufficiently great number of courses to load the walls of each corbel. Thus (11) has a [illegible]

foot of the slope. Assuming again that the rampart is little elevated above the counterscarp of the ditch, but that this is deep (C), the batter will be so arranged that the projectile will sweep it for its entire height at a little distance. If the rampart is built on a precipice of rock (D), the batter will be traced so that the projectile will fall at the foot of the rock, in order to drive away the miners. That will cause it to be understood, the importance of having spherical projectiles of known weight for defending the foot of the ramparts by means of machicolations, according to the nature of the attack, and how the section of the batter should be traced according to the nature of the place. Now if we know today th that officers of engineers calculate with precision the angles of bastions and the sections of ramparts to obtain certain effects, we can be assured that in the 14 th century the military architects devoted no less care and calculation in drawing their machicolations, the copings of their battlements and all details of these constructions, happy proportions, and profiles of a beautiful character.

Still we have seen in Art. Hoard, that the wooden inner galleries with machicolations were covered. It was indeed necessary to shelter the defenders placed in these inner galleries, behind the battlements, from projectiles cast indirectly by the assailants; men then undertook to cover also the machicolations with stone, as they had covered the outer galleries by roofs of carpentrw, but those permanently. The most remarkable machicolations of that kind, that exist in France are c certainly those of the castle of Pierrefonds; they date from 1400. We shall return to them immediately.

Before occupying ourselves with this sort of machicolations, it is necessary to speak of those of the ramparts of Avignon, erected about the middle of the 14 th century, and which present certain peculiarities worthy of attention, for example, the square returns on towers, the angle corbels, projecting machicolations, etc. The machicolations of the ramparts of Avignon having never been intended to be covered, and being surrounded by simple battlements, to avoid overthrow the constructors have given ao the corbels a sufficiently great number of courses to load the tails of each corbel. Thus (11) let A be the corner of a tower, then will be a diagonal corbel at B,

notion according to the section c d will give the profile D a
nion C corbelled courses; the two corbels D will be slightly
apart to obtain equal masses B D and C F, the corbels C and
F will have only 5 courses (see profile 5 made on e f). In a
elevation that angle will present the drawing f, which evide-
nce why the angle corbel B being longer than the others, takes
another course at bottom. The arches of the mashicolations a
adjoining the corner constitute that diagonal corbel. At g is
represented in perspective the course g', at h the course h';
at i the course i', at l the course l'. These corbels with to-
rts loaded by the mass C (see sections C and 4), cannot tip
under the weight of the battlements. The flanking machicola-
ges of the towers being higher than the curtains, the interco-
ni gallery is recessed and the machicolations rise as indicat-
ed on fig. 5; each step m is pierced by the machicolation.
(See profile 7 made on the line r s). The mass at the bases
of the cones at Avignon machicolations obtained by means of
great arches resting on the buttresses. These machicolations
produce long spaces through which one can see not only stan-
ds out clumsy flavrie (see Art. Fortifications Militaire, Fig.
10); they and the inconvenience of not obstructing the fronts of
[illegible]
ments. This system was recently employed by military engineer-
s of the provinces of the South; they adopted by preference
the system of continuous machicolations. Indeed it is necessa-
ry always to work in the works of northern architecture the m
[illegible]
rance and of Italy seem to be made rather to storie the area,
than to oppose a formidable obstacle to the assailants, and
in these countries the machicolations are frequently a decor-
ation or ornament and not an efficient defense.

We have just stated, that the machicolations are not well
processed unless they are covered like the outer parapets.
Then let us examine the machicolations of the castle of Fier-
fonds. These form a continuous series at the base of the t
owers and curtains, they were not only covered, but also ar-
ranged by buttresses, that command the approaches also.
(12) Are were arranged those machicolations. At A we give the
plan of a portion of the outer gallery of the towers taken at
the level a. The holes of the machicolations are drawn at b.

which according to the section c d will give the profile D w with C corbelled courses; the two corbels C will be slightly askew to obtain equal arches B C and C F, the corbels C and F will have only 5 courses (see profile E made on e f). In e elevation that angle will present the drawing G, which explains why the angle corbel B being longer than the others, takes another course at bottom. The arches of the machicolations a adjoining the corner penetrate that diagonal corbel. At g is represented in perspective the course g′, at h the course h′; at i the course i′, at l the course l′. These stones with tails loaded by the mass O (see sections D and E), cannot tip under the weight of the battlements. The flanking watch turrets of the towers being higher than the curtains, the internal gallery is stepped and the machicolations rise as indicated in Fig. L; each step m is pierced by its machicolation. (See profile P made on the line r h). One sees at the palace of the Popes at Avignon machicolations obtained by means of great arches resting on the buttresses. These machicolations produce long spaces through which one can drop not only stones but timbers flatwise (see Art. Architecture Militaire, Fig. 40); they had the inconvenience of not striking the fronts of those buttresses, thus leaving points accesseble to the assailants. This system was scarcely employed by military architetts of the provinces of the North; they adopted by preference the system of continuous machicolations. Indeed it is necessary always to seek in the works of northern architects the m most serious defenses; many fortifications of the South of F France and of Italy seem to be made rather to strike the eyes, than to oppose a formidable obstacle to the assailants, and in those countries the machicolations are frequently a decoration or crowning and not an efficient defense.

We have just stated, that the machicolations are not well protected unless they are covered like the outer galleries. Then let us examine the machicolations of the castle of Pierrefonds. These form a continuous series at the tops of the t towers and curtains, they were not only covered, but also surmounted by buttresses, that command the approaches afar. See (12) how were arranged those machicolations. At A we give the plan of a portion of the outer gallery of the towers taken at the level a. The holes of the machicolations are drawn at b.

At B is drawn the sections of the entire defense and at C is its external elevation. The gallery D with its machicolations is covered by the shed roof g. At regular distances the dormers E are placed on the walls of the galleries opposite the windows F and light the halls I. At K are the upper battlements. The tails of the courses of the corbels I extend deeply into the masonry, and are loaded by the great wall to prevent overturning. The lintels M are cut radially between the corbels as indicated by the elevation; the imposts O are then cut according to the perspective sketch O'; thus no chance of rupture exists in the construction. A recession of the face between the corbels at P leaves a projecting angle, that prevents arrows shot from below from rebounding and ascending into the gallery through holes of the machicolations. At the base of the towers and curtains, a pronounced batter causes the projectiles dropped through the holes to rebound, as indicated by Fig. 10. This was a serious defense, combined in a manner entirely remarkable, when the armies did not yet possess artillery, and when the galleries were sufficiently elevated above the ground, that their walls and roofs had nothing to fear from casting machines, like mangonels, stone-throwers and trebuchets. Without modifying in any manner this system, about the middle of the 15 th century men desired to give to the m machicolations a less severe external appearance; they were sometimes ornamented. For example, such are the machicolations placed over the gate of the beautiful castle of king Rene at Tarascon (13). At the end of the 15 th century the progress of artillery caused the rejection of this mode of defense, yet there were still represented machicolations on the summits of the towers and castles, at least by tradition.

Sometimes machicolations were established on the crossings of churches, when it was judged that they might be invested; thus on the apse of the cathedral of Beziers between the buttresses, and to defend the windows from scaling, there were constructed about the beginniug of the 14 th century machicolations terminated by a parapet with open crenelles in the form of a balustrade. This monument was placed on the highest point of the city and attached to the fortifications, and was regarded as the citadel, and for all time it had been equipped with battlements. (Art. Creneau). At the rebuilding of that

church after the wars of the Albigenses, they merely conformed to a tradition. Here (14) is an external view of one of the machicolations of the chevet, at A is traced the section of the defense. Let us add that the windows are fitted with very close grilles, that present an obstacle sufficient to stop assailants vertically under the holes of the machicolations. Open cornices with great corbels, on projecting corbels are again a last trace of those machicolations, so common in the habitations of lords of the 14 th and 15 th centuries. To close, let us say that the holes of machicolations of the fortifications in the North of France have dimensions evidently according to regulations, they form squares that vary from 13.0 to 15.7 ins. side; thus the projectiles intended to pass through these holes could be taken to any strong place, which was an important point.

MACONNERIE. Masonry.

All construction into which enters stone, rubble, brick, m mortar or plaster. (Art. Construction).

MAIN-COURANTE. Hand-Rail.

Rail of a flight of stairs. (Art. Escalier).

MAISON. House. Dwelling.

It is necessary to distinguish city houses from country houses, but the latter should not be confused with manors. The true country house is that of the cultivator, the peasant, a family attached to the feudal lands. As for the city houses, those of the lords have a particular character. We class these as palaces or mansions.[1] It is true that up to the 12 th century the nobility rarely dwelt in the cities, and the customs of the conquerors of Gaul were long retained by their descendants.

Note 1.p.214. For mansions, see the end of Art. Maisons de Villes.

The habitations of the Gallo Romans could not be modified i immediately after the invasions of the 5 th and 6 th centuries. The new possessors of the territory apparently did not think of causing the erection of houses of a new form, they occupied the Roman villas; for living in the fields by preference rather

than in the cities, if they caused the erection of habitations by their cultivators or serfs, these houses necessarily retained the form consecrated by long custom.

In the art of architecture, the house is certainly what best characterizes the customs, tastes and the usages of a people; its arrangements and its plan is modified only after a long time, and however powerful the conquerors, their tyranny never went so far as to attempt to change the form of the habitations of the conquered people; on the contrary, it occurred t that the invaders yielded in what concerned the habitations to the customs of the vanquished, particularly if the latter were more civilized. Still the newcomers gradually introduced into those customs modifications, that belonged to their character and traditions; they established a compromise between the two principles of existence, and after a century or two had passed, the habitation left by the first possessor of the soil was slowly transformed. However it is unnecessary to believe, that those transformations were such, as not to leave remaining very apparent traces of the habits and consequently of the primitive structure. From the first centuries of the middle ages, i.e., during the Carlovingian epoch, the country dwelling of the French took a character of defense for the c city house, occupying a narrower area because of necessity a and enclosing those cities by walls, these must necessarily abandon in many cases the extended arrangement of the ground story to superpose stories in order to find in height the space lacking in area. If the Romans did not employ wood in profusion, when they constructed houses for themselves, it is c certain that the people of Gaul never ceased to use that material; perhaps during the Roman rule they gave greater importance to masonry structures; but under the influence of invasions from the North, they certainly renewed construction in wood without difficulty. Indeed the art of carpentry, the exclusive use of wood construction only belongs to the Indo-Germanic races. Wood enriched by paintings plays an important p part in the construction of the Merovingian epoch, and the f frequent conflagrations, that destroyed entire cities during the first centuries of the middle ages sufficiently proved t the almost exclusive use of carpentry in private structures.

Of these habitations preceding the 11 th century, there re-

[illegible] today; even one can only form an idea of some
by collecting [illegible] scattered given by the writers, vienna-
ses of manuscripts, very imperfect, and some relics. For how-
ever various these documents, they are less conclusive on one
important point, to know what kind of the first lines
of the [illegible] were made of wood, that these structures
of wood were a mixture of carpentry and piles of timbers con-
nected at one angles; and that point marks our entire given-
tion. For as [illegible]. There are two modes of constructing in
relatively [illegible] wood; one can either pile on each other
the [illegible] trunks of trees by [illegible] [illegible] at the
[illegible] angles, or one can by more or less [illegible] construct-
ions, [illegible] the wood as a rigid support, [illegible]
[illegible], sometimes as [illegible], and sometimes as a simple fil-
line, [illegible] frames of [illegible] [illegible], very light
and allowing the [illegible] of [illegible] [illegible]. The
first of these methods does not require on the part of [illegible]
[illegible] [illegible] of intelligence; as see is followed also
among [illegible] people, while the second belongs only to the pa-
ge [illegible]; we see it [illegible] at the [illegible] among all
[illegible]
and [illegible]. Tracts and forces. The [illegible] the on
[illegible] on the [illegible] of the [illegible] and [illegible]
[illegible] allow us to see some [illegible] of the [illegible] of [illegible]-
[illegible] is [illegible] by [illegible], and [illegible] [illegible] [illegible]-
[illegible] in the [illegible] [illegible] of the [illegible]-[illegible] [illegible]-
[illegible].

It has been [illegible] to [illegible] to [illegible] [illegible] of
[illegible], i.e., to the end of the 11 to [illegible], as
[illegible] [illegible] of these various influences, or the
[illegible] to use [illegible], or the [illegible] to
[illegible] [illegible] [illegible] [illegible] or less [illegible]. In the [illegible] of
[illegible] of [illegible] in [illegible] in [illegible] [illegible] [illegible]-
[illegible] [illegible], [illegible] [illegible] on the [illegible]
of the [illegible] or the [illegible] [illegible] over the [illegible] of
[illegible], or of [illegible] over local [illegible], and
over the [illegible] of the [illegible] from beyond the [illegible].

Thus in the 12 to [illegible] during the greatest [illegible]
of the [illegible] and [illegible] [illegible], in the c
[illegible] in [illegible] the [illegible] of our [illegible], the

remains nothing today; then one can only form an idea of them by collecting laconic statements given by the writers, vignettes of manuscripts, very imperfect, and some reliefs. But however vague these documents, they are less conclusive on one important point, to know that the houses of the first times of the middle ages were made of wood, that those structures of wood were a mixture of carpentry and piles of timbers connected at the angles; and this point merits our entire attention. Let us explain. There are two modes of constructing in exclusively employing wood; one can either pile on each other the squared trunks of trees by notching them together at the square angles, or one can by more or less ingenious combinations, sometimes using the wood as a rigid support, sometimes as a tie, sometimes to relieve, and sometimes as a simple filling, obtain timber frames of extreme stability, very light and allowing the erection of structures of great heights. The first of these methods does not require on the part of constructors great efforts of intelligence; we see it followed also among slave peoples, while the second belongs only to the pure white races; we see it practised at the origin among all the peoples that descended from the northern plateaus of India, among scandinavians, Franks and Normans. The data that one can collect on the habitations of the Merovingian and Carlovingian epochs allow us to see some traces of the method of construction in wood by piles, and sufficiently developed wooden construction in the assembled carpentry of the Gallo-Roman traditions.

At the epoch when we can commence to collect fragments of French habitations, i.e., at the end of the 11 th century, we prove still the influence of those various influences, on the one hand belonging to the Latin civilization, on the other to the Indo-Germanic traditions more or less pure. In the art of construction of houses in France in the middle ages were produced singular oscillations, that depend on the predominance of the Gaulish or the Germanic character ower the remains of the Latin civilization, or of this over local traditions, and over the tastes of the invaders from beyond the Rhine.

Thus in the 12 th century during the greatest development of the Cluniac and Cistercian monastic institution, in the c cities in which the influence of our abbeys dominates, the

cities in which the influence of our abbeys dominates, the h house is constructed of masonry, the Roman tradition resists the influence of the North, while in the cities more indepenent or more directly placed under the royal power, the wooden house daily tends to replace the stone house. The greater or lesser abundance of one of these two materials, the proximity of wood or stone to the centres of population, did not have a decisivi influence upon the system of construction adopted.

In order not to exceed the limits of this work, we must restrict ourselves to mentioning this fact, whose explanations we shall endeavor to give elsewhere.

MAISONS DES VILLES. City Houses.

The scarcity of ground in cities or walled market towns compelled constructors to build several stories above the ground story. If at Rome in antiquity the houses possessed a great number of supeeposed stories, it does not appear that this method was followed in the provincial cities. At Pompeii the h houses have only a ground story with very few exceptions; the antique paintings rarely indicate habitations composed of several stories. On the contrary from the Merovingian epoch urban houses possess one or more stories above the ground story; authors often mention their stories, and the sculptured or painted representations rather show us the form of towers or of elevated pavilions, rather than of adjacent houses. Gregory of Tours mentions houses of several stories; he says that "Priscus had ordered at the beginning of his episcopate, that the buildings of the episcopal house should be made higher." [1] Duke Beppolen being at table in the house of three stories, suddenly the floor fell." [2]

Note 1.p.216. Hist. de France. Book IV. Chap. 36.

Note 2.p.216. The same. Book VIII. Chap. 42.

The Merovingian houses, numerous traces of which remain in the North of France, usually consist of a cellar of masonry not vaulted, surrounded by wooden structures; their perimeter is small and the lodgings must necessarily be superposed. According to that programme appear to have been constructed the houses, copies of which we give here. (1, 2). Fig. 1 evidently indicates a wooden structure; but it must be stated that it is found on a capital of the primitive church of Vezelay preceding the establishment of the commune; while in the same

localities are still seen numerous fragments of stone houses from the beginning of the 12 th century.[1] Dussaud has, Thureau in his letters sur l'histoire de France,[2] in procuring the ruins of the establishment of the commune of Vézelay, portions most remoteness of the ecclesiastics circumvent to surround themselves by exceptional signs of their authoritarianism. "They built a round tower house overlooking valls, even according to his review. One of the most interesting among them, named Girou, in lain the foundations of a great square tower." Fig. 2 presents a peculiarity that could not be omitted, an exceptional arts; indeed we see here these spherical angles or point flights of stone play an important part in the buildings of the 11 th and 12 th centuries. The capacity of Savary among us Parcid and his companions banqueting in a house at the time of their passage in Vézelay. The passers will is mirrored in the sec- and story over a great story forces of arrows; the flight of arrow slightly line next upper wall to the shape of the roof. upon ground story is evidently built of masonry, while the second story appears to be of carpentry.

Note 1.p.217. Fig. 1 reproduces a house carved on a capital of the church of Vezelay, preceding the rebuilding at the beginning of the 12 th century. Fig. 2 gives a house carved from a capital of the cloister of Moissac (12 th century).

Note 2.p.217. Letter 22.

One again finds such arrangements of exceptional angles in Greek manuscripts of the 9 th century (Cod. Paris), and we see it corresponding with the 12 th century. Were this imported from Greek by Francis during the first period of the middle age and until the 12 th century, in which time in carvings representing five man multiplied the fragments of Gallo-Roman antiquity for the ancient story, but that the upper stories have been adjusted the changes introduced by the Gallic tent came from the Orient. Indeed it might be after the invasion, when the old copper-work retained a good number of these Gallo-Roman carpentry or country embellishments, and only on the ground stories continuing them, they had caused to be erected in masonry halls a and services than carry masses. This since then had been adopted a system of construction resulting from the two methods, carried one on the other by the orders of the two civilizations, or rather of two different races. In masonry the Gallo=

locality are still seen numerous fragments of stone houses from the beginning of the 12 th century.[1] Indeed Aug. Thierry in his Lettres sur f'histoire de France,[2] in recounting the phases of the establishment of the commune of Vezelay, mentions that tendency of the emancipated citizens to surround themselves by external signs of their enfranchisement. "They built a around their houses battlemented walls, each according to his wealth. One of the most important among them, named Simon, la laid the foundations of a great square tower." Fig. 2 presents a peculiarity that should not be omitted, an external stairs; indeed we see that these external stairs or great flights of steps play an important part in the habitations of the 11 th and 12 th centuries. The tapestry of Bayeux shows us Harold and his companions banqueting in a house at the time of their passage in Normandy. The banquet hall is situated in the second story over a great story formed of arches; the flight of steps descends from that upper hall to the shore of the sea; that ground story is evidently built of masonry, while the second story appears to be of carpentry.

Note 1.p.217. Fig. 1 reproduces a house carved on a capital of the church of Vezelay, preceding the rebuilding at the beginning of the 12 th century. Fig. 2 gives a house copied from a capital of the cloister of Moissac (12 th century).

Note 2.p.217. Letter 22.

One again finds that arrangement of external stairs in Greek manuscripts of the 8 th century (Art. Perron), and we see it perpetuated till the 16 th century. Note this important fact; that in France during the first period of the middle ages and until the 12 th century, it seems that in private habitations have been maintained the traditions of Gallo-Roman antiquity for the ground story, and that for the upper stories have been adopted the customs introduced by the people that came from the North. Indeed it might be after the invasion, that the new conquerors retained a good number of those Gallo-Roman city or country habitations, and that on the ground stories composing them, they had caused to be erected in carpentry halls a and services that they needed. Thus since then had been adopted a system of construction resulting from the two methods, grafted one on the other by the habits of the two civilizations, or rather of two different races. In masonry the Gallo=

Roman influence makes itself felt very late, while the estate of Ross from the outset had a character, that evidently belongs to the region from north, and that having possible the act of conquerors of the Romans. That reorganization of the systems of consequence series from two opposed civilizations, and only with great difficulty succeeded in forming a complete entirety, and until the end of the 12 to century, one realizes that the mixture is not effected.

The [illegible] of the 11 to century [illegible] is marked in its combination, because it entirely abandoned Roman traditions, and only as that canon did these private architecture assume a [illegible] [illegible], [illegible] [illegible] [illegible] according to the materials used in the work. It suffices to look at the modern monuments of the 9 to, 10 to and 11 to centuries, at some ivory carvings of such epoch, and even at the tapestry of Bayeux, to prove the influence of the traditions of Gallo-Roman construction in the masonry of the Romanesque styles of the noticeable, and that of Lazo-Germanic work-man accounts on the upper parts of palaces and houses, while the centuries always affected the form of the Latin basilica or that of the Byzantine religious edifice.

Evidently if the Lords and chieftains allowed the monks to arrange the architecture of their monasteries at their pleasure (and this was taken by tradition), they exerted an influence on construction connected with strictly their decorations, and in spite of the anticlerical existence between the cradle of the conquerors from beyond the Rhine and the old Gallo Rome had become Latins, it seemed that at the contact of the superior races, the Gallo-Roman recalled its origin and gradually resumed the native tastes, resuming against the Roman area so long conquered, and to its [illegible] was planned to construct an art of its own. Thus already in the 12 to century, the masses of the oldness monks reasoned the resistance buildings of the monasteries; it is a different art with other methods of construction; civil architecture is formed with the establishment of the communes, it assumes its independent character like the feudal castle, which on its part offers more and more from the Roman villa, to the traditions of which above alone remain faithful. It is always interesting to see how many people left to their own inventions, the arts

Roman influence makes itself felt very late, while the structure of wood from the origin had a character, that evidently belongs to the races from the north, and that nowise recalls the art of carpentry of the Romans. That superposition of two systems of construction springs from two opposed civilizations, and only with great difficulty succeeded in forming a complete entirety, and until the end of the 12 th century, one recognizes that the mixture is not effected.

The lay school of the 13 th century succeeded in making this combination, because it entirely abandoned Roman traditions, and only at that epoch did these private structures assume a character truly French and homogeneous, adopting logical methods according to the materials used in the work. It suffices to look at the western manuscripts of the 9 th, 10 th and 11 th centuries, at some ivory carvings of that epoch, and even at the tapestry of Bayeux, to prove the influence of the traditions of Gallo-Roman construction in the masonry of the ground stories of the habitations, and that of Indo-Germanic wooden structures on the upper parts of palaces and houses, while the churches always affected the form of the Latin basilica or that of the Byzantine religious edifice.

Evidently if the lords and citizens allowed the monks to a arrange the architecture of their monasteries at their pleasure (and this was Latin by tradition), they exerted an influence on constructors charged with erecting their habitations, a and in spite of the antipathy existing between the caste of the conquerors from beyond the Rhine and the old Gauls that had become Latins, it seemed that at the contact of the purest races, the Gallo-Roman recalled its origin and gradually resumed the native tastes, reacting against the Roman arts so long continued, and in its habitations was pleased to compose an art of its own. Thus already in the 12 th century, t the houses of the citizens nowise resembled the residence buildings of the monasteries; it is a different art with other methods of construction; civil architecture is formed with the establishment of the communes, it assumes its independent charm just like the feudal castle, which on its part differs mo-more and more from the Roman villa, to the traditions of which the abbeys alone remain faithful. It is always interesting to see how among peoples left to their own instincts, the arts

and geometrically accentuates replaces the semicircles of lower stage.

In the 12 th century monastic architecture has reached its climax and advances no further. It merely endeavours to consume in the mounting that is left daily, by imposing on it auxiliary as a primary condition; but after the 13th century and, then as planned to give as a type of religious association, was swept away in the common interest. In the country, military and domestic architecture developed also prodigious activity; the old remains of Roman arts were decisively set aside, and the ornament, like the lorem, desired to have a fleeting act, weak limit itself to all requirements of the changing habits of a people. As soon as the power of the religious association is weakened, too municipal and even the political world appeared, and the country has not yet ended, when all rocks of art and industry were in the hands of these elements, and fifty years earlier, must have moved from the monasteries the plan of a palace, even of the ironwork of the doors.

It would be of the highest interest to have again today some of those city houses of the 11 th century, i.e., of the common when the Gallo-Roman habitations were built quite anew, and with the primitive Italian conformed so closely with the architectural forms imported by the people from the north of Germany and by the Normans. We only have from those times rarely imperfect documents affected by the restorations; however they allow us to prove the presence of those models structures, but have an analogy only with some old cathedrals of Denmark, Tyrol and Switzerland. [1]

Note 1.p.219. But it must be stated that the Gothic element has profoundly modified these structures of the South, yet one still recognises there the traces of that Indo-Germanic character characterized in the monuments in monuscripts.

In the country and departure of the 12 th does not recall the Roman house. The outlook is no longer on the internal courts, as in the antique house, but on the public street, and if the court still exists, it is reserved for merely domestic service. From the street one directly enters the principal hall, nearly always raised above the ground by several steps. If the

and especially architecture reflect the tendencies of their minds.

In the 12 th century monastic architecture has reached its climax and advances no farther. S. Bernard endeavored to restore to it the meaning that it lost daily, by imposing on it simplicity as a primary condition; but after him that puritan art, that he claimed to give as a type of religious establishments, was swept away in the common torrent. On the contrary, military and domestic architecture developed with prodigious activity; the old remains of Roman arts were decidedly set aside, and the citizens, like the lords, desired to have a flexible art, that lent itself to all requirements of the changing habits of a people. As soon as the power of the religious establishments weakened, the municipal anf even the political spirit appeared, and the century was not yet ended, when all works of art and industry were in the hands of those citizens, who fifty years earlier, must have asked from the monasteries the plan of a palace, even of the ironwork of the doors.

It would be of the highest interest to have again today some of those city houses of the 11 th century, i.e., of the epoch when the Gallo-Roman traditions were still quite entire, and with the primitive Gaulish combined so strongly with the architectural forms imported by the people from the north of Germany and by the Normans. We only have from those times very imperfect documents afforded by the manuscripts; however they allow us to prove the presence of those wooden structures, that have an analogy only with some old carpentry structures of Denmark, Tyrol and Switzerland. [1]

Note 1.p.219. But it must be stated that the Slavic element has profoundly modified these structures of the Tyrol; yet o one still recognizes there the traces of that Indo-Germanic carpentry characterized in the monmuents an manuscripts.

The appearance of the French city house of the end of the 11 th century and beginning of the 12 th does not recall the Roman house. The outlook is no longer on the internal courts, as in the antique house, but on the public street, and if the court still exists, it is reserved for merely domestic services. From the street one directly enters the principal hall, nearly always raised above the ground by several steps. If the

proportion has some importance, that first hall in which one are received and set in display by a near room, which serves as a kitchen, or as a living room or secondary dwelling; the chambers are situated in the second story. But a drawing will avoid too lengthy explanations. Here then (3) is the plan of one of those houses of the beginning of the 12 th century.[1] From the street one accesses to the hall A by the ceremonial of steps[2] possessing a first landing with a bench, and then a second landing enclosed behind [illegible] in the hall.

Note the [illegible], [illegible] theorets and upper chamber.

Note 2.p.220. This arrangement is common in the provinces where stone is abundant, as in Burgundy and Auver Charente; it is well understood to have been adopted, when the houses belonging to private men had no need of shops on the street. Remains of those houses with entrway and enclosed landing are to be seen at Vezelay and at Montrichle. We have also been able to recognize these arrangements in houses at Montbar, [illegible] and Joinville. There still exist round stairs of this kind perfectly preserved in certain Italian cities, and particularly in at Viterbo. (See Architecture civile et domestique of Mr. Verdier et Jottrot).

This second landing is either supported by corbelling or by a little column at one outer angle. The dwellings of the landlord so surrounded, serves for a shelter for the tenant to the cellar. These are generally spacious, well built and well ventilated, with central columns and transverse arches. Even so-called there are two stories of cellars, particularly in provinces with vineyards. Beside the enclosure there is solid and heavily fixed, is a little opening for receiving serving that Brook at the door. From that first hall, which is usually lighted only by a window looking outside and by the doorway, when the weather is fine,[2] one enters a large [illegible] at the ground which leading to the second story. One ascends about one passes into the little internal court D, a [illegible] common to several houses and possessing a well. This court is lighted the rear room C that serves as kitchen for the family. In the second story the apartment is the

habitation has some importance, that first hall in which persons are received and eat is doubled by a rear room, which then serves as a kitchen, or as a dining room on ordinary days; the chambers are situated in the second story. But a drawn plan will avoid too lengthy explanations. Here then (3) is the plan of one of those houses of the beginning of the 12 th century.[1] From the street one ascends to the hall A by the bent flight of steps [2] presenting a first landing with a bench, and then a second landing enclosed before the entrance door, which is solid.

Note 1.p.220. After plans collected especially in Burgundy, Nivernois and upper Champagne.

Note 2.p.220. This arrangement is common in the provinces where stone is abundant, as in Burgundy and upper Champagne; it is well understood to have been adopted, when the houses belonging to private men had no need of shops on the street. Remains of those houses with stairway and enclosed landing a are to be seen at Vezelay and at Montreale. We have also been able to recognize these arrangements in houses at Montbar, S Semur, Chatillon-sur-Seine, Arc-en-Barrois, Chateau-Villain and Joinville. There still exist ground stories of this kind perfectly preserved in certain Italian cities, and particularly at Viterbo. (See Architecture civile et domestique of MM. Verdier et Cattois).

This second landing is either supported by corbelling or by a little column at the outer angle, the underside of the landing so suspended, serves for a shelter for the descent to the cellar. These are generally spacious, well built and well ventilated, with central columns and transverse arches. Even sometimes there are two stories of cellars, particularly in provinces with vineyards. Beside the entrance doorway, that is solid and heavily ironed, is a little opening for recognizing persons that knock at the door. From that first hall, which is usually lighted only by a window looking outside and by t the doorway, when the weather is fine,[3] one enters a lobby B ending at the winding stairs leading to the second story, and beneath which one passes into the little internal court D, s sometimes common to several houses and possessinm a wella From this court is lighted the rear room C that serves as kitchen for the family. In the second story the arrangemen is the

were: the floors even serves as bedroom for the family, and a rear room being reserved for sue servants. But this second story is often built of wood.[4] Its side window occupies more than half the space, and the whole is covered by a projecting roof, for the building is built so high soon and rarely ex-ceeds the eaves to the street. The half timber construction of the front of the upper storey is made of large timbers, and rests on very strong beams, that on the upper rest in the division walls, and is plastered between the timbers; on the exterior are traces of ornaments made with a compass. The ceiling of the projection of the roof and the half timber work itself are painted in striking colors, yellow and black, ma-ga and brown or red, red and black.[1] We give below the plan and view of the facade of such Pompeiian houses.

Note 8.p.270. The custom of leaving open the doorways of ground stories in peaceful times, and when the temperature was not too cold, is on ancient habit continued very late. The doorway was then simply covered by a portiere. Vignettes of pompeiian alcove indicate that kind of closure.

Note 4.p.280. Having found a number of those ground stories of houses of the 12 th century surmounted by modern stories in Bergamo, we have been induced to think that the second st-ories originally were lightly built. Then by examining the t ope of the dictation rolls that alone remained in these attic-tures, we have been able to prove the traces of half timber construction of the front corbelled out flush with the sect of buttress built on the extension of the party walls.

Note 1.p.222. We have found traces of these painting on wood removed and replaced in structures of the 14 th and 15 th cen-turies, particularly on the portiere recut.

The internal accompaniment of the Pompeiian house were aum-ioty different from those of the Gallo-Roman and Provincial houses. Indeed one still finds in the latter the separation of the apartment of the women, while the common life is introduced in the house of the 14 th century. Gregory of Tours also man-tions the woman's apartment; he says that "Gontimirus was sent into the Domain of Wulfram to burn the mill and grapes even by the fiscal requires for the food of the women sequered in the women's apartment." [2] In the Pompeiian houses of the 12 th century the family collected around the same brazier. In the

same; the front room serves as bedroom for the family, the r rear room being reserved for the servants. But this second s story is often built of wood.[4] Its wide window occupies more than half the space, and the whole is covered by a projecting roof, for the building is double at that epoch and rarely presents its gable to the street. The half timber construction of the front of the upper storw is made of large timbers, and rests on very strong beams, that on the other hand lie on the division walls, and is plastered between the timbers; on the plaster are traces of drawings made with a point. The underside of the projection of the roof and the half timber work itself are painted in striking colors, yelloy and black, white and brown or red, red and black.[1] We give below the plan and view of the facade of that Romanesque house.

Note 3.p.220. The custom of leaving open the doorways of ground stories in peaceful times, and when the temperature was not too cold, is an ancient habit continued very late. The doorway was then simply covered by a portiere. Vignettes of manuscripts always indicate that kind of closure.

Note 4.p.220. Having found a number of those ground stories of houses of the 12 th century surmounted by modern stories in masonry, we have been induced to think that the second stories originally were lightly built. Then by examining the t tops of the division walls that alone remained in these structures, we have been able to prove the traces of half timber construction of the front corbelled out flush with this sort of buttress built on the extension of the party walls.

Note 1.p.222. We have found traces of those paintings on wood removed and replaced in structures of the 14 th and 15 th centuries, particularly on the rafters recut.

The internal arrangementr of the Romanesque house were sensibly different from those of the Gallo-Roman and Merovingian houses; indeed one still finds in the latter the separation of the apartment of the women, while the common life is indicated in the house of the 11 th century. Gregory of Tours also mentions the women's apartment; he says that "Septimina was sent into the domain of Marlheim to turn the mill and prepare each day the flour required for the food of the women gathered in the women's apartment." [2] In the Romanesque house of the 12 th century the family collected around the same hearth. In the

stairs above the large room is the same. If one order is a
secondary; then the hall is in the second story. This hall ser-
ves as a bedroom, a sequering place; it is large and contains
the bed of the farmer, mother and the children of small age.
The apprentices and servants sleep in the garrets over the s
cond story. Then nearly always the kitchen is separated fr-
om the principal building by a little court; a gallery permits
one to reach it under cover; a passage connecting the servants
wings flanks the shop and affords entrance directly from the
street into the hall of the second story. From this hall one
likewise passes by a gallery to the story over the kitchen.
According to this system are arranged the houses of the city
of Cluny, which date from the 12 th century.[1] We give (4) the
plan of one of them.

Note p.p.222. Hist. France. Book IX. Chapter 3d.

Note 1.p.222. See Architecture civ. et dom. of M.Verdier and Cattois.

The ground floor is given the following which has breaking ope-
ra at C, the shop at D, two open porches at E, could at F,
the kitchen at H with the great fireplace I. A well at G. The
second story is given at F and shows the arrival of the stai-
ra at K, the hall at L, open or glazed gallery at V, then a
narrow stairs to access to the garrets, and a chapel at O.
The general section through the house on a b is given in Fig.
5 at A, and a street elevation of the front at B. The facade
is still conserved today on to the level C, the story of the
garrets alone having been destroyed; as for the later buildings,
these scarcely remain any traces. The houses of the 12 th cen-
tury of the city of Cluny are adjoining, i.e., are separated
by party walls common to two properties, and although this c
ncept may be common in most Lemon cities, there are certain
localities, particularly in Burgundy, where the houses of the
12 th and 13 th centuries are separated by narrow passages,
and consequently each has its independent side walls. We can
recognize that this course likewise exists in most of the lim-
ia walled cities, built at one time as the and of the 13 th
century under the rule of Edward I in Guienne. But the modif-
cations in force concerning the location of houses in the cit-
ies of France in the middle ages, their projections on the p
ublic ways, the manner of lighting, the dimensions of rooms,

ground story the large room is the shop, if the owner is a m merchant; then the hall is in the second story. This hall serves as a bedroom, a gathering place; it is large and contains the bad of the father, mother and the children of small age. The apprentices and servants sleep in the garrets over the s second story. Then nearly always the kitchen is separated from the principal building by a little court; a gallery permits one to reach it under cover; a passage containing the straight stairs flanks the shop and affords entrance directly from the street into the hall of the second story. From that hall one likewise passes by a gallery to the story over the kitchen. According to this system are erected the houses of the city of Cluny, which date from the 12 th century.[1] We give (4) the plan of one of them.

Note 2.p.222. Hist. France. Book IX. Chapter 38.

Note 1.p.228. See Architecture civ. et dom. of MM.Verdier and Cattois.

The ground story A shows the passage with the straight stairs at C, the shop at D, the open portico at E, court at F, the ketchen at H with its great fireplace I. A well at g. The second story is drawn at B and shows the arreval of the stairs at K, the hall at L, open or glazed gallery at N, with a narrow stairs to ascend to the garrets, and a chamber at O. The general section through this house on a b is drawn in Fig. 5 at A, and a street elevation of the facade at B. This facade is still preserved today up to the level C, the story of the garrets alone having been destroyed; as for the later buildings, these scarcely remain any traces. The houses of the 12 th century of the city of Cluny are adjoining, i.e., are separated by party walls common to two properties, and although that c custom may be common in most French cities, there are certain localities, particularly in Burgundy, where the houses of the 12 th and 13 th centuries are separated by narrow passages, and consequently each has its independent side walls. One can recognize that this custoc likewise exists in most of the little walled cities, built at one time at the end of the 13 th century under the rule of Edward I in Guienne. But the regulations in force concerning the location of houses in the cities of France in the middle ages, their projections on the p public street, the manner of lighting, the discharge of water,

vised initially, even long before established a particular
caution on the secretary subject to his jurisdiction. It also
assumes that two doses already when an unnecessarily very
well, a single cool with two saves on two lateral stresses.

One still sees in the little city of Montmaris some remains
quite after this system, and one should observe in near the se-
te in one side toward Avallon, which has been very well pres-
erved. Fig. 6 reconstructs the plan. These double doses appear
to date from the first years of the 13 th century.

As 2 are the stone known to the collegs on the public street
according to Tuscanian customs, as C C' are the halls of the
ground story. As D are two little courts covered by air rooms
of room only rising over the ground story. The main hall is
common, though the fireplace are separate. From the hall C one
ascends to the second by taking the in range E and to the hall
C' by taking the lateral E; one in the upper story the door
of the stairs in the house D is at F, and that of the house
C' at G. At I is a courtyard well. In the street, this double h
ouse resembles the Italian (7). Yet from architecture also ass
ert architect stairs a massive in the second story, and pre-
serves of the public real sign a second entry, and the
one fireplace of steps. The two passages to the cellars and the
two balconies are analogous. Toward these functions are pl-
ceas against stairs I by the main passages.

Other measure these rooms were common to several houses or
belonged only to some one of them, for the enclosures of these
rooms have long since been overthrown, they extent to the a
ssalant vicinity.

The isolating passages covered two houses, whether there w
ere single or double, necessarily led the occupants to build
some walls near the passages and holes on the access. These
passages are perhaps "outcomes" in the Saxon language, and a
[illegible] of covered passage along the streets, an arrangement very c-
mon in small Saxon and English walled cities built in the 12
th and 13 th centuries the doors of the Saxons, Burghers
and [illegible] in the economy property, the particular autho-
rities, but it was necessary to leave passages between the
houses, for this made an to profit by the land of the

varied infinitely, each lord having established a particular custom on the territory subject to his jurisdiction. It also occurred that two houses adjoined with an intermediate party wall, a single roof with two eaves on two lateral streets.

One still sees in the little city of Montreale some houses built after this system, and one among others is near the gate on the side toward Avallon, which has been very well preserved. Fig. 6 reproduces the plan. That double house appears to date from the first years of the 13 th century.

At A are the entrances, flights of steps and stone benches; at B are the steps down to the cellars on the public street according to Burgundian customs, at C C′ are the halls of the ground story. At D are two little courts covered by hip roofs of wood only rising over the ground story. The stair hall is common, though its flights are separate. From the hall C one ascends to the second by taking the landing E and to the hall C′ by taking the landing F; thus in the upper story the door of the stairs in the house C is at G, and that of the house C′ at H. At I is a common well. On the street, this double h house presents the facade (7). The front buttresses with their corbels support a balcony in the second story, and the projection of the gable roof with a common gable, so that the t two flights of steps, the two descents to the cellars and the two balconies are sheltered. Behind these habitations are planted little gardens reached by the narrow passages. We cannot state whether these gardens were common to several houses or belonged only to some one of them, for the enclosures of these grounds have long since been overthrown; they extend to the a ancient rampart.

The isolating passages between the houses, whether these w were single or double, necessarily led the architects to build eave walls next the passages and gables on the street. Those passages are termed "endronnes" in the Gascon language, and s sometimes existed when the houses formed a continuous portico or covered passage along the street, an arrangement very common in small French and English walled cities built in the 13 th and 14 th centuriesson the banks of the Garonne, Dordogne and Lot, and in the southern provinces.[1] One perfectly understands, that if it was necessary to leave passages between the properties, two lots were united to profit by the land of one

passage. Of two houses, two areas really made but one, with a separating wall in the axis of the gable. However this method is rarely employed.

Note 1.p.225. Among the little walled cities built at one spurt from 1260 to 1330, we shall cite those of Aigues-Mortes, Carcassonne, (lower city), Libourne, Villeneuve d'Agen, Villefranche-de-Rouerge, Montflanquin, Valence, Castillones, Souveterre, Puyguilhem, Le Souvebot, Villereal in Agenais, Villefranche-de-Belves, La Linde, Beaumont, Domme, Sainte-Foy, Villefranche-de-Longchapt, Molieres and Montpozier, in lower Perigord; Mont-Segur, Belin, Cadillac, S. Osbert an Creon, in the suburbs of Bordeaux. (See Articles on l'Architecture civile du moyen age, by MM Felix de Vernilh and Victor Petit; Annales archaeologiques; Vols. VI, X, XI, XII). In the North of France, we will cite also the cities of Villeneuve-le-Roi, Villeneuve-l' Archeveque; all those little cities present regular plans laid out with a cord, with places, markets, churches, fountains and remparts, houses with or without covered alleys, but on equal lont. We know that these facts derange somewhat the theories of the irregularity and the systematic disorder, that are attached to the civil structures of the middle ages; but we can only invite archaeologists to visit these localities, if they desire to obtain an idea of a little city of the 13 th century, built on a fixed plan within a very brief space of time. As M. de Vernelh said so well:- "In the second half of the 13 th century and in a very limited region of France, in Guienne and in Languedoc, perhaps fifty cities were founded without our historians having given the least attention to that great work of civilization and of progress. At least twenty of those little cities, the most recent and most perfect, are due to the English domination, and the histories of Sismondi and of Guizot do not mention this benefit, always real, t though dating back six centuries. If instead of founding so many cities, Edward I had destroyed a single one by violence, all our books would have still reckoned with that armed act. But the history of the middle ages is made thus." Let us add that these precious data collected by one of our most learned French archaeologists, do not appear to be consulted by M. C hampollion-Figeac, who enlarges at length on the urban structures of the middle ages in his treatise on Droits et Usages,

these houses of the end of the 13 th century.

encroaching on the matter of architecture without having had leisure to visit some of these civil structures, and asks us where we found the plans of Aigues-mortes, Villeneuve-le-Roi, Sainte Foy and Montpazier! As if the execution corresponded t to the projects! Who also demands of us to prove the antiquity of the houses of the lity of Cluny. But could we not with much more reason require him to demonstrate the authenticity of the texts, that he takes the trouble to transcribe? Those cities are still standing and are inhabited, and in some days anyone can see them with their straight streets and the remains of their ramparts, their squares and their churches; as for the projects of their location, it would doubtless be interesting to recover them, although that discovery could add nothing of importance to the fact of the existence of those c cities, that for six centuries have not ceased to be inhabited.

The alleys between the houses sometimes have only the width of a channel stone, as one can yet see in the city of Montpazier, whose general plan is one of such perfect regularity a and arrangement(Art. Alignement, Fig. 1), but then these houses have two facades, one on the street of 32.8 ft. width, the rear one on an alley about 9.8 ft.[1] We shall soon return to these houses of the end of the 13 th century.

Note 1.p.227. One will see that this custom is retained in London.

We have given a house of the city of Cluny that dates from the 12 th century; in our Art. Construction, Figs. 115, 116, 117 and 118, are seen the elevations, plans and sections of a facade of a house of the same city, built about the middle of the 13 th century. The windows are already longer, the stories are higher, the stone construction is more important and the appearance more elegant. In some walled cities were erected in the 13 th century houses with several stories, whose facades were entirely built od stone. On the square of the c city of S. Antonin, that possesses such a beautiful municipal house of the 12 th century (Art. Hotel de Ville), one sees quite a large number of houses of the 13 th century with a monumental appearance.[1] Those houses are spacious and deep, possessing facades sufficiently extended and remarkably constructed. The ground story is occupied by stores or shops, the second and third stories being occupied next the street by a

a great hall in front with a stairs and little room attached and looking out on an alley as at Montpazier. Here (8) is the facade of one of those houses fronting on the square of the c city.

Note 1.p.228. S. Louis purchased from the count of Toulouse the city of S. Antonin for 1500 livres Tournois ($315). The house that we give is a little later than the time of that p purchase.

The arches of the ground story served as places for sales on market days, as still practised in many localities. Then portieres were suspended beneath the arches to shelter sellers and buyers. The large halls in the second and third stories are fully lighted by continuous arcades, that in the interior form windows separated by narrow piers. At the top of the house beneath the roof is the attic occupied by servants, and where provisions were stored. One will note that the piers of the windows at the height of the springings have rings of iron with crockets. Those rings were intended to receive poles to which were fastened awnings. That custom is continued in the south of France, Italy and Spain. Fig. 9 reproduces the arrangement of these awnings.

A A is one of the ring crockets fixed in the masonry. The awnings were divided in bays, as well as the poles that fitted into each other. (See detail B). Struts C raised the bottom of the cloth, whose movement and inclination were maintained by crossed cords passing underneath, and fixed by rings to t the crockets D. A wide gathered fall fell in front, as much to stop the rays of the sun as to give weight to the lower p part of the awning, and thus to comple the struts C to remain inclined.

The little city of Cordes between S. Antonin and Gouillac h has retained nearly all its houses that date from the 12 th and 13 th centuries, and approximate by their architectural style and internal arrangement to that just described. But those cities on the banks of the Garonne, Lot and Aveyron, were deeply permeated by the communal spirit, or rather had never ab abandoned the municipal traditions of the Gallo-Roman epoch; most had retained the remains of private habitations, that i indicate a very developed local administration, great internal prosperity and habits of comfort and even luxury that dis-

disappeared after the religious wars of the 16 th century. Our epoch allows itself freely to go wit the current of certain prejudices, which flatter selflove and dispense with studying properly certain arduous questions, because they require time and research. How many times has it not been written, for example, that the houses of the middle ages are only poor hotels, gloomy and small, dark and finally uninhabitable? [1] Certainly the old houses of S. Antonin, Cordes, S. Yriex, Montpazier, Toulouse, Perigueux, Alby, Mont-Ferrand, Cluny, Provins, Bourges, Laon, Beauvais, Rheims, Soissons, Dol, Caen, Chartres, Dreux, Angers, etc., are only small edifices, if compared to our modern mansions of Paris, Lyons or Rouen, but it should not be forgotten that most of those old houses still standing, exist only in cities singularly declined, that in cities of the second or third rank, now abandoned but then rich and prosperous, although they were of little importance if compared to the great centres of population of the same epoch; that those old houses, if placed parallel to those built today in the same localities, are incomparably better constructed, better understood and with an appearance less poor; that they indicate a social state more advanced and more solidly established, a prosperity less fleeting and stronger municipal institutions. It is evident that by establishing a parallel between one of those houses of the little city of Cordes and the mansion of M --- at Paris, a free field would be opened to jesting; but let us compare an old house of S. Antonin to one of those built today in the same locality; compare the mansion of M -- with a mansion of Sens or that of de la Tremoille, mansion S. Pol or that of Cluny, or even the house of Jacques Coeur at Bourges, that exists nearly entire, on which side will be the laughers?

Note 1.p.230. See the work of M. Champollion-Figeac, Droits et Usages, already cited. If a man of profound erudition shows those prejudices, one cannot be surprised to see them extend among the common people.

We do not desire to make here a social nor even a political criticism; we shall speak of art. Now when art is concerned, it is a strange illusion to confound the civilized condition with the intellectual development. If a society be perfectly policed, if habits of comfort be disseminated in the lower

classes of the society, that does not state that its intelligence is developed; particularly that does not cause the life to be diffused in all branches of the social body. If in the 12 th or during the 13 th and 14 th centuries great edifices were built, and if artists abounded in Paris, Rouen, Lyons, R Rheims, Chartres, Bourges, Tours and Toulouse; in the last 1 little city, in the smallest village of France would be found an art also relatively elevated; is that so today? We build magnificent palaces at Paris, Lyons or Marseilles; but wha is done in the chief places of a canton, in villages? Poor s shaky and badly conceived structures, hideous in appearance although they affect a certain appearance of luxury; inconvenient houses, scarcely sheltered, concealing the egnorance of the contractor or the stinginess of the owned under coatings that every winter causes to fall. Into those weak buildings art not only does not enter, but good sense and reason seem to be excluted. A shred of puerile vanity alone appears on the symmetrical facade or in the interiors with their poor luxury. We marvel to see in a little antique city like Pompeii, mean houses built of brick covered by stucco still present examples of delicate art; but we possessed in the middle ages the same privilege of placing art in everything. The houses of Pompeii would scarcely be comfortable for us, people of the 19 th century; those of the 13 th century in France are hardly more so; what does that matter in the question of art? The houses of Pompeii charm us because they are indeed the dwellings of the inhabitants of Campania; those of Cluny or of Cordes have the same qualities. But what will be ours for the people that will see them six centuries hence, if any remain? We admit that c comfort is the master today; then let us be consistent.

Is it comfortable to erect at Marseilles houses on the model of those of Paris, or even to construct facades exposed to the north similar to those open to the south? It is comfortable to light the rooms, small or great, by means of windows of uniform dimensions, to have narrow window piers for great halls and wide ones for cabinets? Porticos on the house, that allow sun or rain to enter for the entire width of their pavement, are those comfortable? It is comfortable that this multiplied division into rooms of an area of small extent, which causes life in the inteeior to be spent in opening and closing

room, and in not enough space to place the work satisfactorily
furniture? And those stories? Less than 5.4 fb. in depth
towards the ceiling, are very easily and unfortunately tra-
ns lies really, there also people have neither interest to al
variations of temperature, that absence of ventilation in fa-
milies, that lavers the cracks around all day at the sky,
are hence considerable reason? Let us go to the country, under
it is mean tones! The little white house with walls so thin
as transparent, roofs covered by sheets of zinc, windows sim-
ply badly, damp stone stairs, floors not quite that evenly,
windows differing a centimeter only in the exterior, but always
invariably opening on a constant square particles, planted
in the east in this monotonic uniformity? The outer angles
with the little towns, orphanages roofs, factory of brick or
stone, that prevent to enjoy all convenience; in this ba-
ins substantial for an air. All that is much the same a
ure fastened by iron: the corrugated roofs are covered poo-
rly, but are open pressure of wind, that alike the ne-
ar in last loss the interior; the bad walls stain: for fin-
ds are not near the water basin the latrines. The absence f
for water in insufficient: the fireplaces noise because the
matter air rise, as proper in a square, and the flues are
well designed long year in open walls. Overcrowded dormitory
cause crowds because large rooms are frequent in the ground
story, and the same adopted are intentionally divided by partit-
ions. Hygiene also in the middle of fields. Is should an-
ver not, if we insist to measures all day over or less exp-
ensive expenditure of the modern chemical: infects provided in
size to drains or some healthy fragrant making the atmosphere
attractive, can one be made only into the required
of dim. Besides, had he refused, would not ten others have b
been found?

The habitations of the middle class were made for the daily
of lucre the stricter lower further, that always nearly had
nearly constructed. Every area is intended by a particular
architecture; the floor is not only to please the eyes of the
planer, but for air also enters the lungs. The window is not
attached with space final art, but it limits the room in it
lengths to light, and is the dimension noted to take room.
The stairs is not concealed but visible. The facade is antis-

doors, and to not know where to place the most indispensable furniture? And those storiesof less than 9.8 ft. in height beneath the ceiling, are they healthful and comfortable? Those thin walls, those zinc roofs that subject interiors to all variations of temperature, that absence of projections on facades, that leaves the openings exposed all day to the sun, are those comfortable things? Let us go to the country, where it is much worse! The little white house with walls as thin as pasteboard, roofs covered by sheets of zinc, windows closing badly, damp ground stories, floors and stairs that squeak, kitchens diffusing a nauseous odor in the interior, but which externally appear as a beautiful square pavilion, gleaming in the sun; is that habitation comfortable? The modern chateau with its little towers, ornamented roofs, facings of brick or stone, that pretend to imitate old construction; is this chateau comfortable? Not at all. All that is show; the tower s are fastened by iron; the complicated roofs are covered economically, but have open crestings of zinc, that allow the water to leak into the interior; the thin walls crack; the floors are tco weak for their spans and deflect. The discharge f for water is insufficient; the fireplaces smoke because the hearths are wide, as proper in a chateau, and the flues are small because they pass in thin walls. Everywhere overhangs cause cracks because large rooms are required in the ground story, and the upper stories are infinitely divided by partitions. Fireplaces rest on the middle of floors. We should never end, if we desired to enumerate all the more or less secret wretchedness of the modern chateau. defects revealed in time to others by some lawsuit brought against the complaisant architect, who has on the whole only done what was required of him. Besides, had he refused, would not ten others have b been found?

The habitations of the middle ages were made for the habits of those that erected them; further, they always wisely and simply constructed. Every need is indicated by a particular arrangement; the door is not made to please the eyes of the passer, but for him that enters the house. The window is not arranged with symme rical art, but it lights the room it is designed to light, and it has dimensions suited to that room. The stairs is not concealed but visible. The facade is shelt-

of the ground story from other fragments of the same time and the same provinces, those have been destroyed in the house on the S. margin of Amarna.[1]

Note 1.p.288. There still exist beneath this house two stories of very fine cellars.

sheltered if necessary. Sculpture is rare, but the floors are good and solid, and the walls have sufficient thickness. In t the southern provinces the windows are small, in those of the north, they ahe numerous and large. Besides for the house of the citizen, the programme varies little. Always a hall in ea each story with internal stairs, or more frequently at the r rear with a little court. It is admitted that this is not comfortable for us; but that arrangement suited the habits of t the time, when even in the castles the family, i.e., the kinsmen and servants gathered in one room around the master. The programme being given, the architects fully satisfied it, which allows us to assume that they would have equally fulfilled any other programme, even those of today.

If in a city of the North, commercial and populous, we seek houses built on a programme similar to that causing the erection of those of S. Antonin, Cordes and Sarlat, dating from 1230 to 1300, we find some of them at Beauvais, Soissons and Amiens, much mutilated indeed, but which still show their system of construction. There is always the large hall in each story nekt the street; but in the cities of the North civil architecture is larger and more monumental. The houses manifest the spirit of the communes that have reconquered their prilileges. For example, let us examine this house that one still sees in beautiful fragments in Rue S. Martiu at Amiens, and which recalls by its style the houses of Beauvais and Soissons of the same epoch (9 bis); it dates from 1230 to 1240 like that of S. Antoniu. But there is a certain magisteroal air in that architecture, which gives it a marked superiority over those of the cities of the South. We have restored the gable of the ground story from other fragments of the same time and the same provinces, those that have been destroyed in the house on Rue S. Martin of Amiens.[1]

Note 1.p.233. There still exist beneath this house two stories of very fine cellars.

This marked difference of style is more striking still, when one takes a parallel between the houses built in the North, a and those in great part constructed of brick in certain cities of the South. Here (10) is a house of Caussade; it is contemporaneous with that of S. Antonin and that of Amiens, and dates from the middle of the 13 th century. The bases of the piers

of the great story, the lively influence of the Italians, are a
[illegible] of the superior style are of work more from Italy; the
the rest of the composition is of brick.[2] In plan that house
[illegible] by the ground but rises above a large well lighted ar-
[illegible] with fireplaces, a stairs and a rear cabinet lighted fr-
[illegible] a garden. The front story is divided by a partition, and
forms two rooms. One still feels in this habitation the influ-
ence of the little [illegible] fortress; that was a residence of
[illegible] qualities of [illegible] [illegible] [illegible] [illegible]
of the [illegible].[3] [illegible] [illegible] [illegible] [illegible] [illegible]
[illegible] later, from 1710 to about 1730; let us [illegible] of the 1
[illegible] and [illegible] of that [illegible]; we shall do [illegible] [illegible]
[illegible] the [illegible] of the [illegible], [illegible] [illegible], [illegible] [illegible]
in Tambour. That house has a much [illegible] ground story, but
has preserved intact its second story on the public [illegible]. T
[illegible] [illegible] [illegible] [illegible], [illegible] [illegible] [illegible] [illegible]
to be found under the modern roof.

Note 2.p.238. This house belongs to M. de Moleville, who a
[illegible] to preserve as [illegible] [illegible] [illegible] [illegible] [illegible]
[illegible] of the lower story were closed and the windows of the
second story were changed in the 18 th century, but the plan
[illegible] [illegible] of the [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]
covered. Those of the two upper stories have been preserved.

Note 1.p.238. In the work of M. Verdier and Cottois, see
some houses of the southern provinces, notably that of the
[illegible], of Corbes. There are seen on the facade of the house
of [illegible] [illegible] [illegible], [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]
[illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]

The facade of this room commence first high and with ele-
[illegible] in the night; [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]
as of musicians, larger than nature; beginning at the foot a
the first musician plays on the drum and a sort of clarinet;
the second plays the bagpipe, the third in the middle holds a
[illegible] on his flute; the fourth plays the harp and the fifth
the violin; the last is accompanied by a [illegible] of flowers. Here
[illegible] is a [illegible] of the Fleuve. Of the scene of the present story
[illegible] in our fig., there remains only the small [illegible] [illegible]
one of the piers. A side corridor entrance opens at the opposi-
site and has a [illegible] [illegible] by [illegible] of the
[illegible] years. The of [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]

of the ground story, the little columns of the windows, the b bands of the imposts alone are of hard stone from Caylus; t the rest of the construction is of brick.[2] In plan that house gives in the second and third stories a large hall nearly square with fireplaces, a stairs and a rear cabinet lighted from a garden. The fourth story is divided by a partition and forms two rooms. One still feels in that habitation the influence of the little private fortress; that was a remainder of those traditions of southern municipalities during the wars of the Albigenses.[1] Let us then take in the Northa house a little later, from 1240 to about 1250; let us seek one of the l largest and richest of that epoch; ue shall go to Rheims and examine the house of the musicians, so called, situated in Rue du Tambour. That house has a much mutilated ground story, but has preserved intact its second story on the public street. T The roof rose above in mansards, no more traces of which are to be found under the modern roof.

Note 2.p.233. This house belongs to M. de Moleville, who w was willing to promise me neither to sell nor destroy tho The shops of the lower story were closed and the windows of the second story were changed in the 15 th century, but the plan and the form of the primitive windows have been perfectly recovered. Those of the two upper stories have been preserved.

Note 1.p.236. In the work of MM. Verdier and Cottois, see some houses of the southern provinces, notobly that of the Veneur, at Cordes. There are seen on the facade of the house of Coussade given here, rings fixed to the jambs of the windows to hold rods and awnings as protections from the sun.

The facade of this house possesses four high and wide windows in the piers; those niches are decorated by seated figures of musicians, larger than nature; beginning at the felt t the first musician plays on the drum and a sort of clarinet; the second plays the bagpipe, the third iu the middle holds a falcon on his fist; the fourth plays the harp and the fifth the violin; the last is crowned by a chaplet of flowers. Here (11) is a bay of the facade. Of the shops of the ground story indicated in our Fig., there remain only the small arches and one of the piers. A wide carriage entrance opens at the opposite end into a court formerly surrounded by buildings of the same epoch, but of these only fragments are found. The build-

building on the street is of single depth, and it seems that it was divided into two nearly equal rooms. The stairs was in the buildings on the court.

This house perhaps belonged to the confraternity of musicians of Rheims, which in the 13 th century enjoyed a certain reputation, not only in Champagne but also in the entire north. As may be judged by examination of our Fig., the construction is simple and the ornamentation is rich. The figures are in the best style of Champagne.[2]

Note 2.p.236. Several times already has there been a question of the demolition of this beautiful house, the most interesting of the civil edifeces of Rheims. Awaiting that demolition, one of the owners (for the facade belongs to two private citizens) took care to have his facade painted every two or three years, including the statues. If this house must be destroyed, it would be much desired, that the facade should be rebuilt in Rheims itself; certainly the small sacrifice that the city would then impose on itself would be very largely recompensed by the interest presented by the preservation of this work of art.

The provinces had for their private buildings different schools of art as for their churches and their public establishments. The house of Burgundy in the 13 th century did not resemble a house of Aquitaine, Ile-de-France or Normandy. Thus for example, we find only in Burgundy that sort of house, whose screw stairs is placed in the front wall next the street and serving as a vestibule to the ground storw. At Avallon a and Flavigny, in the little city of Semur in Auxois and even at Dijon, are still seen remains of houses, that present in plan the arrangement shown here (12). At the middle of the facade is placed the stairs A, partly corbelled out over the entrance doorway B; at the left or right, according as the stairs turn, is the door C that gives entrance to the first room D, from which one enters the second E and then the third F; and thus in each story. From the common room E, one enters a court or a little garden G. As a facade on the public street, this house presen s the elevation (13). The entrance door B is sheltered by the projection of the stairs, whose enclosure is placed on the ends of the steps corbelled out before the facade; an entrance O to the cellar is placed beneath the sill

of one of the windows of the ground story; the cellars in Burgundy have always been an important appendage of the habitations. This simple, economical and commodious arrangement (for nothing in the second and third stories prevents the small r room F from becoming an anteroom opening into the two large rooms D and E) accorded well with the procedures and materials of construction of Burgundy, which furnishes excellent hard stone, suitable to place those thin stair enclosures projecting on the ends of the steps of the first revolution.

Further, on examiniing the habitations of this epoch which still exist in one province, if one finds that certain general arrangements of plans were adopted by all at the same moment, as according with the needs, yet one finds in the details and in the mode of piercing the windows, an extreme diversity. Because during that fine phase of the middle ages, the feeling of individuality was not extinguished; everyone thought rather of satisfying his tastes or his personal needs, r rather than to imitate his neighbor, and to model himself on a uniform type. No municipality would have cared then to impose on all owners in the same street a uniform height of bands and a uniform style of architecture, and in that century, which men point out to us as a time of oppression, the idea would never have occurred to any authority whatever to mould t the habitations of a thousand citizens on the same type. Each one then had too much consciousness of his own individuality, and his personal responsibility, to suppose that men could be penned like animals in a zoological garden in similar barracks to please the eyes of idle loiterers. One will note in the e elevation in Fig. 13 the arrangement of the stone gutters inclined toward the two end gargoyles supported on projecting corbels. That is an arrangement still common in Burgundy and in upper Champagne. Besides, where long and resistant stones are lacking, these gutters are simply hollowed in a beam or in a plank covered with lead. From the middle of the 13 th ce century indeed in Burgundy and Champagne, men avoided allowing water from the roofs to fall before the facades, but led it by gutters to projecting gargoyles placed vertically above piers of the party wall.

We saw at Vitteaux fifteen years since several charming houses of the 13 th and 14 th centuries, nearly all demolished

or changed today. One of them, dating from the second half of the 13 th century, presented in plan the following arrangement (14) of the ground story.

At A beneath the enclosure of the stairs, as in the preceding example, is the entrance door. The door to the cellar opens on the street at B. Having passed th entrance door, one passes into the little vestibule C; from thence directly into the kitchen D and to the left into the hall. The same arrangement is repeated in the second story and gives two chambers; then in the third beneath the roof is a great room divided in two in the depth of the building. The elevation (15) shows at A the entrance door, and at B is that of the cellar. The enclosure of the stairs is no longer supported on the euds of t the steps, but on a well jointed rampant platband. At the top the enclosure of the stairs passes from the cylindrical to t the hexagonal form, so as to facilitate the covering by wooden tiles. An internal court, or rather a planted garden behind the house, gives air aud light to the kitchen and the rear pa part of the hall. The building next the garden is enclosed by half timber work (see plan). Profiting by the projection given by the corbelled stairs, and by a corbel vertically over the pier of the left party wall, the architect has placed a projecting unequal truss to shelter the entire facade (see elevation). Water runniug in the partly wall gutter is thrown to the left on the street by a wooden gargoyle, and to the right into the court by a wooden duct emptying into a small stone reservoir placed in the corner of the kitchen. In the ground and second stories are fireplaces arranged in the party wall, and chimneys with caps are visible in the elevation. Thus on an area of about 1076 sq. ft., and of which 160.8 sq. ft. were reserved for the construction, the Burgundian architect of the little city of Vitteaux found means to erect a h house capable of lodging properly a family in sanitary rooms, well lighted and sufficiently spacious, evidently for a very moderate sum; for one notes that the front and party walls al alone are of masonry; the floors rest on these two party walls and on the middle half timber partition. A structure of this kind of the style adopted would cost in the province, i including the cellar, $4.65 per sq. ft. the house would then come to the amount of $2,450. Now we can see the structures

fairly spacious in the little cities of the department; on an area of such limited extent they just are, are less expensive and convenient, but also they are remarkably ugly, although they endeavor to resemble the great dones of a citizen of a the western great city. The exactly the reference of arrangements taking places in their quiet apartments, where they are invariably without exception modern and if in theatre; and in it that great country an part proved by modern city efficiency. That pleasen and oneme in those modest buildings is the respect of the ends and needs of the family indicated by their the character of the arrangements of apartments, the adaptation, the skill and care, let us say, with which the artist has found for perfect in all the peculiarities of the place prepare. Remember that our modern cities were laried under ends like Jewell, it would be very difficult for architecture, that therefore that the changed part merely, to obtain an idea of the beauty, massive and quiet of the performance that actual and if our system today a calmly prepared means of the middle ends. everything is been constructing results in the ends of life of their apartments. Into one family a dwelling the architecture, distinct taste, the furniture and decoration.

Further, the decorations of the lord and even the chair of the citizen. Just the decorations of Lordship particularly in the city, are immediately from the dwelling of the citizen, perhaps or decorations in a different manner. If the citizen place his facade on the street and tends to live on the street, on the contrary the noble erects his mansion behind and between a court and garden; in the middle erected in object or decoration with or offices. That is the home of the noble citizen resembles a lantern, in each case the lord or of a man by-case a door overcome is closed to the area of the parent. If even from somewhere that the mansions of industrial and the city in fact to have the idea of building for family a modern palace a court and garden. That is one of house street life or many private institutions effectively to give it effect, that the if in country and industry, and that the lord that might the dwelling the factories and industries. Then Tallemant des Réaux, who also about constructions of the a modern palace of the city, that his look in the apartments

daily erected in the little cities of the departments; on an area of such little extent they cost more, are less sanitary and convenient, but also they are remarkably ugly, although they endeavor to resemble the great house of a citizen of t the nearest great city. Not entirely the richness of ornamentation pleases in these civil structures, since they are generally without sculpture until the 15 th century; nor is it t that common symmetry so much prized by modern city officials. What pleases and charms in those modest buildings is the imprint of the needs and habits of the family sheltered by them; the sincerity of the procedures of construction, the unexpected, the skill and mind, let us say, with which the artist has known how to profit by all the conditions of the given programme. Assuming that our modern cities were buried under ashes like Pompeii, it would be very difficult for archaeologists, that discover them two thousand years hence, to obtain an idea of the tastes, manners and habits of the generation that erected them; but if one enters today a tolerably preserved house of the middle ages, everything in those habitations recalls to us the mode of life of their occupants. There one feels a people with its own character, distinct tastes, its traditions and tendencies.

Further, the mansion of the lord and even the house of the citizen, that has become an important personage in the city, are distinguished from the dwelling of the citizen, merchant or manufacturer in a striking manner. If the citizen places his facade on the street and tends to live on the street, on the contrary the noble erects his mansion behind and between a court and garden; on the public street he places an enclosing wall or offices. Just as the house of the simple citizen resembles a lantern, so much that of the lord or of a man become a great personage is closed to the eyes of the passer. We have seen somewhere that the marquise of Rambouillet was the first in Paris to have the idea of building for herself a mansion between a court and garden, that is one of those errors like so many others insistently propagated to make it believed, that the 17 th century did everything, and that before that epoch was nothing but darkness and barbarism. First Tallemant des Reaux, who alone among contemporaries of the m marquise speaks of the care, that she took in the construction

of her mansion, says not a word of this, and had he said it, the mansions existing much before that epoch would have given him the most complete contradiction. Indaad the mansions of S. Pol, Tournelles, Bourbon, Tremoille, Sens, Guise, op Cluny at Paris, were and still are between a court and garden. It would then be easy in a city to recognize the habitations of important personages from those of citizens. But the houses of the citizens themselves had a particular stamp because of the condition or position of those inhabiting them. The houses of a manufacturing and commercial city like Beauvais, Amiens or Rheims or Troyes, do not resemble those of a city inhabited by landed proprietors living on their incomes, on commerce in grain, wines or other products. If the house of a citizen of Rheims or Troyes is open in the ground story or elevated on a portico, for example, to allow the merchants to discuss their affairs, that of Provins or of Laon, for example, is carefully walled on the street to the height of the second story. Fig. 16 reproduces the facade of one of those houses of Provins, looking on Rue de Paris, and dating from the second half of the 13 th century.

Here the inhabitant shuts himself up; the outside has nothing to do with what passes inside. The hall is in the second story as well as the chambers. The ground story is reserved for the offices, provisions and kitchen. The stories are high between floors' one feels that in these habitations life is simple and broad. Further, one will observe with what care the c construction is executed, how the openings of the windows are well relieved by those stone discharging arches; how that facade is composed of so few elements, yet it takes a monumental character. To know how to put art into a rubble wall pierced by openings aud without any decoration, without costly procedures in construction, limiting it to that strictly necessary, is in that the mark of a very advanced social condition, from the point of view of art, and can we say as much of our city? We are not ignorant that for a great number of persons today, art is only an expansion of luxury, a superfluity, and that in the matter of architecture the facade not faced by columns or pilasters, by mouldings collected nearly everywhere according to the fashion, is not at all a work of art. The middle ages letf few books or discourses on art, but whoever was an

artist knew how to put art on the richest facade and on the w wall of the humble dwelling of the citizen of a little city; he knew how to love and respect that art in its modest expressions as in its splendid concepetions. An age that no longer believes itself able to manifest its taste for art except by accumulating ornaments, or by spending enormous sums, but which in works of every day forgets its elementary principles, passes from one type to another, no longer possesses originality, and that century tends to the decinle of the arts. When an epoch has descended to this inferior level in the history of the arts, the execution is gradually impoverished; no longer employed except for pritileged works, it retires from the extremities to concentrate its last efforts on some points; barbarism daily gains more area.

men still build palaces and monuments where every richness is piled without order or reason; but the habitations, the d edifices of the small city, are no more than coarse works, r ridiculous and uniformly vulgar, whose defects in construction promptly do them justice. It is the only remaining consolation in the midst of those wretched things, to minds sufficiently occupied with art matters, to believe that posterity will yet judge somewhat of civilizations by their monuments. When art is no longer a matter of luxury, the day of its proscription is near. In the middle ages the vital power of art is manifested everywhere; its expression is a need for all, great and small. The old houses that still covered our old French cities a few years since, and that new needs cause to disappear rapidly, were the living proof of this. We do not claim, at the cost of the public health with the development of the prosperity of the middle classes, that there must be preserved even the rotten hovels; but we should love to find again today in our private structures those instincts of a people loving the arts and knowing how to propagate everywhere their true expressions. But no, this old and rich Gaulish blood, that after l long compression could circulate freely in the 13 th century, carry life into the provinces, cover the soil with edifices of every nature, original, logical, frank and without alloy, the true enclosures of the nation full of brilliant qualities; this limpid and pure blood has coagulated anew under a second foreign invasion. It has been necessary again to become Romans,

and yet again with Jessel. Everything must religious logic, and social imitations of a land are in accordance for the native originality of our country. Also everyone particularly wants has taken root in every mind, and indeed-nature for a many are also more enterprise or religion, however it cannot be consid-ered before quite naturally clear and logical, and psychical that usually there for that area are forced for us, and is the midst of which we feel ourselves at home.

The issue of the middle ages in France as the emigration of a war-area on the soil. The place of our home is the planned logical, indirectly contradicting; as the life of an architect, the religion and people, preserves the life, authors and works of war military; as if the logical belief for a money equal is alarmed to a crack of fashion. That architecture is determi-nant for us on the moole, and as soon that the man devoted to a career today is commission to have a house built for mis-self, if he desires not to daily have to struggle with the a vagrancy and the difficulties caused by the religious logical, forgive in fill ab open in his own as an rather, but a nature the only factors nearly identical, although which have already called in to the of malancholy, if is our mean-ry ye could fall under the power of that malady!

Note 1.p.216. It is necessary to be truthful; excess in pr-once soon leads to reaction, and everything leads one to bel-ieve that the critics of yesterday is after are [illegible] place the tendency of the (if not) century, and intelligently the same years, will lead to a universal revolt against this barbarous fashion of understanding the art of architecture.

The fact that is a matter is not impact of his friend it is so. In our time such dar have attempted first to model. Be-ne say, the tendencies of a city into regular structure, al-ident and idealoral. The lords of the middle ages did not an-increased some reason that our actors architect officially pen-tions of art, the media has not [illegible] the media from ex-pressing its are. Notably the English do not seem at that time in many [illegible] years, and in water [illegible] of fac-ulties, as cannot what [illegible] dare ar-"In the annual half of the it in country, a sign of peace and prosperity," says M. Felix de Vernerin,[2] " a little corner of one of our corinnes was rapidly covered by those new cities called

and yet under what Romans! Symmetry must refplace logic, and pallid imitation of a dead art is substituted for the native originality of our country. False doctrine persistently taught has taken root in every mind, and infatuation for a showy art that none understands or explains, because it cannot be explained before minds naturally clear and logical, has replaced that innate taste for that true art formed for us, and in the midst of which we feel ourselves at home.

The house of the middle ages in France is the habitation of a man born on the soil. The house of our time is the common d dwelling, uniformly comfortable; as the life of the merchant, his customs and needs, resembles the life, customs and needs of the soldier; as if the lodging suited for a notary would be adapted to a woman of fashion. That uniformity is inconvenient for us on the whole, and is such that the man devoted to a career todan is compelled to have a house built for himself, if he desires not to daily have to struggle with the w weariness and the difficulties caused by the ordinary lodging. Everyone is ill at ease in the box that he has rented, but p passers see only facades nearly identical, and which would have already caused us to die of melancholy, if in our country we could fall under the power of that malady! [1]

Note 1.p.246. It is necessary to be truthful; excess in France soon leads to reaction, and everything leads one to believe that the orgies of symmetry to which men have been left since the beginning of the (19 th) century, and particularly for some years, will lead to a universal revolt against this barbarous fashion of understanding the art of architecture.

But (and that is a motive to not despair of the future) it is no in our time that men have attempted first to mould, let us say, the inhabitants of a city into regular divisions, aligned and identical. The lords of the middle ages did not understand much better than our modern municipal officials questions of art, but which has not prevented the nation from possessing its art. Notably the English do not seem at that time to have fathomed France genius; and in their condition of foreigners, we cannot wish them to have done so:- "In the second half of the 13 th century, a time of peace and prosperity," says M. Felix de Verneilh, [2] " a little corner of one of our provinces was rapidly covered by those new cities called

"bastides" (walled towns) in the language of the South. Let us see by what circumstances Alphonse de Poitiers, brother of S. Louis, had become by his marriage with the heiress of the counts of Toulouse the nominal lord of a part of Guienne." As such and although that sovereignty was frequently reduced to a title, he claimed to ensure his direct authority by causing the building of a capital, Villefranche de Rouergue."In Agenois he founded Villeneuve d'Agen and several less important market towns. In Perigord, where he had some possessions, he also founded bastides." Those cities or bastides were built on lands granted freely, according to the recommendation o of the engineers, and enjoyed extensive franchises. This was one means of attracting to a direct dependence on the sovereign entire peoples; the means succeeded in spite of the protests of the feudal lords and the excommunications of the bishops. "On his part," continues M. de Verneilh, "Edward I, first as duke and soon as king, greatly multiplied foundations of tha t kind;and this is one of the best titles of that great prince to the grateful memory of the old duchy of Guienne. Among others, Libourne owes to him its existence (1286)." Beaumont was thus built for the account of the king of England in 1272; Marshal Jean de la Lande commenced on his own domain the bastide of La Linde. The city of Montpazier was built about 1284. Now that plan of Montpazier drawn in 1284 has not since been changed. Like all plans of cities of that epoch, traced in Guienne and Perigord, the city of Montpazier is not only aligned with perfect regularity,(Art. Alignement, Fig. 1), but also all houses are of equal dimensions and are arranged in the same manner. A block of houses of the city of Montpazier (17) shows with what cellular uniformity those habitations a are built. Certainly the regularity observed in modern cities, like Napoleon-Vendee and certain cities of Algeria, is only disorder in comparison with that absolute symmetry. It must be admitted (which would then be true), that all men settling in those privileged walled towns, a sort of refuges offered by a sovereign, were all on a basis of equality; whatever they were, it is certain that they submitted to these conditions of alignement, of facades anf areas imposed, since those cities were built at one spurt, and attained a degree of very high relative prosperity shortly after their construction.

Thus one recognizes that these ideas, which we believed belonged to our own epoch, of workmen's cities, of centres of population established with an appearance of socialist equality, are not new, and that the middle ages attained therein a practical point, from which we are still very distant. But however modest are these habitations, they are at least in relation to the needs and habits of the epoch. They all consist of a ground story, a second and sometimes a third story; their facades vary in appearance, because the tastes and fortune of each one; [illegible] they are well built and solid. The square of the city itself, at one side of which is the city hall, is surrounded by very wide porticos; [illegible] at the stairs [illegible]; for the engineers that traced the plans of these villes neuves carefully refrained from having the streets pierce the middles of the sides of a that square, which would have conformed to academic rules, but not at all to those of reason. A square is generally in a city an area more or less large where men gather; if the streets cut the middle of their sides, it is clear that [illegible] inconvenience must those remaining there. To establish circulation along the sides of a square and leave the middle without circulation has always been the purpose of the founders of the cities of the middle ages. Cut-off angles arranged at the square returns of the corner houses permit wagons to enter the square easily on market days. In present (12) the plan of one quarter of the town of Montpazier,[1] and [illegible] from the point A of the plan. One sees in that Fig. how the angles of the houses are supported by corbelling above the wide cut-off angles, that afford entrance diagonally to the square.

[illegible] are built of stone, brick or rubble; wooden constructions

Note 2.p.246. See Annoles archaeologiques. Vol. VI. p.71. Few archaeologists have made in our time studies so complete and rich, as M. Felix de Verneilh has done in what concerns the cities of the middle ages in porticular.

Thus one recognizes that these ideas, which we believef belonged to our own epoch, of workmen's cities, of centres of population established with an appearance of absolute equality, are not new, and that the middle ages attained therein a practical point, from which we are still very distant. But however modest are those habitations, they are at least in relation to the needs and habits of the epoch. They all consist of a ground story, a second and sometimes a third story; their facades vary in appearance, because the tastes and fortune of each one; further they are well built and solid. The square of the city alone, at one side of which is the city hall, is surrounded by very wide porticos, low and ending at the stairs affording entrance to that square; for the engineers that traced the plans of those walled towns carefully refrained f from having the streets pierce the middles of the sides of t that square, which would have conformed to academic rules, b but not at all to those of reason. A square is generally in a city an area more or less large where men gather; if two streets cut the middle at right angles, it is clear that passers inconvenience much those remaining there. To establish circulation along the sides of a square and leave the middle without circulation has always been the purpose of the founders of the cities of the middle ages. Cut-off angles arranged at the square returns of the corner houses permit wagons to enter the square easily on market days. We present (18) the plan of one quarter of the town of Montpazier,[1] and (19) the perspective view of one entrance to that place taken from the point A of the plan. One sees in that Fig. how the angles of the houses are supported by corbelling above the wide cut-off angles, that afford entrance diagonally to the square.

Note 1.p.248. At Montpazier the properties have all their side walls. This arrangement is even retained around the square, where there exists o portico; this is an exception to t the rule.

The houses of those walled towns of the end of the 13 th c centurw are built of stone, brick or rubble; woodeu construction

is excluded from the facades. Further, wooden houses are very rare in the southern provinces, while from the end of the 13 th century we see that they gradually become more common in the northern provinces. At first it is only the upper stories that are built of half timber work, then soon the ground story alone remains in stone; then finally during the 15 th and the beginning of the 16 th centuries, entire facades are not only erected in half timber construction, but frequently they are even entirely of wood like large furniture, without any visible trace of masonry. Besides the taste that the peoples of the north have always retained for wooden structures, besides the enfluence exerted on those peoples by the traditions brought by southern invasions, the vicinity of great forests, wooden construction presented advantages, that must lead all inhabitants of the populous cities of the French provinces, properly so called, to employ this method.

As we have stated, in those great cities of the north, such as Paris, Rouen, Beauvais, Amiens, Troyes, caen, etc., the s square was rare. These cities were surrounded by walls and c could not extend as in our days; then men sought to gain in height the area lacking in plan, and they infringed as much as possible on the space of the public street by means of corbelled stories; now wooden construction lent itself alone to these arrangements imposed by necessity. Men then thought of sheltering the surfaces of facades by the projection of the roofs, whether the eave or gable wall was built on the street. The streets gradually became narrower as the cities became richer and more populous without baing able to move o out their walls, and the windows were enlarged to admit the most light possible. But on that subject, we must place an o observation here. In our time, and not without reason, men a aim to light abundantly the interiors of rooms of a habitation; it was not so during the middle ages. The earliest Romanesque houses are pierced by windows relatively narrow and allow little light to pass, the inhabitants seeking obscurity in interiors with as much care as men seek light; there were still traces of an antique tradition. In the 13 th century, houses began to have wides windows; one sees at least a hall well lighted. This taste extends as an active life, industry and commerce assume more importance among the urban population.

All conditions had need of the light of day to devote themselves to their occupations. The house was no longer the closed refuge of the family, it was also the workshop; thus in the industrial cities the houses were widely opened on the street from the end of the 13 th century.

In spite of the opening of the facades of tha epoch, one scarcely conceives today, how in those narrow streets bordered by houses with overhanging stories, certain industries could be exercised; that is explained only when one has seen, f for example, the silk workers of Lyons work on the most delicate fabrics in rooms in which one would scarcely believe that he could read. Sight accustoms itself to obscurity, and the excessive natural or artificiil light, that we introduce everywhere today, is not an absolute requirement for laboring on works of great delicacy. However that may be, from those workshops of the middle ages, that seem so dark to us today, came works of woldsmiths, embroideries and fabrics, when with all the light that we have, we attain their delicacy with difficulty. These are only questions of habit, and of what a workman is accustomed to from infancy, to work under a doubtful l light, it does not follow that this workman i: unskilful. So that when our fathers saw the Cid of Corneille played by the light of candles, it is unnecessary to conclude that they appreciated less vividly the masterpiece of the tragic poet. On Once for all, let us leave there those reproaches made to the architects of the houses of the middle ages for having made dark and uninhabitable hovels; gloomy and uninhabitable for us maybe, but the citizens of tha time found them commodious and sufficiently lighted. That was independent of the question of art; the greater or lesses architectural quality nf the facade of the house does not depeud on the greater or lesser width of the street on which it stands. We have the proof of this every day.

Here (20) is one of those houses built of masonry and of w wood, that we drew at Chateaudun in 1841. The ground and second stories are built of stone, the party walls of rubble; the re rear wall on the court is also of stone. In the ground story (see plan A) opens on the street a vast storehouse with a central post and wall pier B. A main girder rests on a corbel of the pier of the middle of the facade, on the central post and

on the head of this wall pier; it receives the floor beams. A partially open screw stairs ascends to the second and third stories. From the corridor C one passes into the court D and into the rear hall E. On the second story the arrangement is similar, except that the girder passes through the front wall and receives the tiebeams of the carpentry. To obtain the most possible light from the street, the constructor has turned two discharging arches in the thickness of the front wall, and beneath these arches he has set actual very open stone sashes. The story of the roof is divided into two rooms in depth of the building. One notes that a carpentry truss projects on t the front wall so as to properly shelter it. That truss rests on the ends of plates held by ties and on the end of the axial girder also held by ties. The beams of the floors are set at the levels G and H. The construction of this house belongs to the beginning of the 14 th century. But in this example the roof story is not set on corbelling.

Fig. 21 gives the plan and elevation of a house of Laval a of a little later epoch, but in which the wood construction assumes more importance and is lorbelled from the ground story. This house, whose facade rises on a street having a strong inclination, is divided for two families. The slope of the street has permitted the constructor to give a lower entrance f for the occupant at the left, the beams of the floors being at B and C; the occupant on the right has only a high ground story and a second story, the beams of the floor being at the level C′. As indicated by the plan P, each occupant has his stairs ascendiug from the shop to the second story. A half t timber partition placed on the axis of the facade separates the two habitations from the top to bottom. The half timber f front of the second story projects beyond the plane of the h half timber front of the ground story, and rests on these beams corpelled out (Art. Pan de Bois). This half timber work of the second story is sheltered by the head truss of the roof s set on the ends of the plates S. The front corner posts are there only to maintain the half timber frace next the street, for behind these corner posts rise the partw walls of rubble supporting fireplaces. Here the masonry of the facade stops at the height of the ground story of the left habitation, and lower for the right one. The half timber frame, as on the pre-

preceding example, is let into masonry between the posts, discharged and staggered.

These two examples already show with what freedom the architects of houses employed these simple and sensible methods that they had to follow; profiting by the arrangement of the localities, the slopes, the quality of the materials, satisfying the given programmes without adhering to conventional forms, but still observing scrupulously the principles of solid and durable construction. It was indeed necessary for those principles to be good, that habitations erected by the aid of such simple and inexpensive means could endure for five centuries.

At the time when half timber corbelled frames seem to prevail for urban habitations, this mode is not subject to the s same system of construction in all provinces composing the F France of today. Wise and choice in the provinces north of t the Loire, toward those of the Centre and East it retains a primitive appearance. For example, in Bresse the wooden houses of the 14 th and 15 th centuries possess half timber frames in which the system of horizontal timbers, still used in Switzerland today, is apparent and combined with the system of f framed carpentry. This system of horizontally piling beams, besides belonging to certain peoples, whose ethnic character is recognizable, is also caused by the abundance of resinous trees, straight like the fir of the Vosges, Jura and Alps. If it be indeed difficult to pile horizontally oak trunks, that require length and troublesome squaring, on the contrary nothing is easier than to place on each other trunks of fir, naturally straight and easily squared. In the provinces of the East and even in those of the Centre, forests being abundant and numerous in the middle ages; notably on the upper Loire, the Loire and Ardeche, part of ancient Lyonnais, the mountains now arid, four centuries ago were covered by secular forests protected by feudal laws. Thus it is not rare to find still o in those provinces old wooden houses, evidences of the abundance of that material. In the little city of Annonay exists, or still existed some years since (for those old habitations disappear like leaves in autumn), a small number of houses of the 14 th and 15 th centuries almost entirely built of wood, whose construction merits being studied, and that have escaped the fires of the 16 th century. We give (22) one of these,

which we classify among the houses of the 14 th century.

On a ground story built of great blocks of stone is placed a deep series of fir timbers, the third row forming a floor and projecting in fronh so as to carry as corbels the half timber frame of the second story, composed in front of three superposed sills and jointed, on which stand the verticals. Two corner posts receive the ends of those sills. At the sides i ordinary half timber work filled wit rubble and mortar, forming party walls. On this first half timber frame a second corbelled floor receives a third story of like framework, surmounted by a roof projecting much on the street, whose construction is sufficiently explained by our Fig. The projection of the roof from the face of the wall of the ground story is about 11.5 ft.; thus the facade is perfectly sheltered from rain and snow; these habitations were then appropriate for t the climate of that province, hot in summer and very rough in winter. It is easy to recognize that this sort of wooden houses do not at all resemble those erected north of the Loire. There are different traditions and different needs. The citizen of the cities of Lyonnais required less light and more efficient shelter. For example, at Annonnay it was desired n not only to protect the facades from the snow squalls, but al also the steep streets, so as to facilitate the circulation of the inhabitants in winter. Because in the middle ages, whatever may be said by the detractors from that epoch, the citizen did not shut himself up in that brutal egoism so general today: in building his house, he also regarded himself as a citizen and built for himself and his city. In our time the street regulations are established to protect common interests. Then the regulation of the streets were certainly less complete and less foreseeing, but each citizen thought a little more of the general interest and desired to ensure the we wellbeing of all. Now that combination of general and particular interests adhered to by all the inhabitants of the same city is more intelligent, than could be the most complete and best executed regulations. From the point of view of art, the result is quite interesting otherwise. It is in that like private compared with public charity. If the latter be regular and perhaps more efficient, the former is more delicate and intelligent. But we do not have to occupy ourselves with that

We are very far from believing that the houses of certain

sad side of our modern civilization, which seems ts require continual praise to avoid injurious comparisons. Let us return to our domestic architecture.

The construction of houses of horizontal timbers is better characterized if we approach the Alps. At Nantua are still s seen some houses of nearly the same epoch as that of Annonay given above, bu whose construction more nearly approaches t that of the Swiss habitations called chalets. One finds very old traditions in these houses (23). The manner in which the half timber framing of the second story is placed on the masonry, the double plates under the roof, belong entirely to the primitive structures of certain peoples, that only employed the method of carpentry by horizontal timbers, while the form of the front truss forming a shelter of certain parts of the half timber work approaches the framed carpentry so common in the north of France. It is necessary to hasten to make a complete and critical study of those old remains of habitations on Gaulish soil,for that study can powerfully aid in classifying the races distributed over the territory. Religious edifices and castles are erected under influences frequently foreign to the soil, where we find ourselves today, while the houses retained till very late the primitive traditions of the indigenous peoples. For example, in England one cannot mistake that all wooden structures of the 14 th and 15 th centuries, still numerous, have a great analogy to the art of naval c carpentry. The connections of timbers, their relative strength, the frequent use of curves, recall constantly the combinations of the carpentry of vessels; while at the same epoch in the north of France we see employed a method of carpentry, only composed of vertical timbers with cross-pieces, relieved by some X-braces; in the East a very old method, and which more or less seems to belong to this nucleus of the people, t that occupied the entire area between the upper Loire, Saone, the Alps and the Jura; in the West anf South, a very restricted system of carpentrw, that only consists of floors and roofs, allowing the mason to erect the front, side and division walls.

Note 1.p.257. The construction of the chalets is most interesting to study, and it is one of those most nearly approaching in Europe the wooden structures of the primitive ages.

We are very far from believing that the houses of certain

provinces in the middle ages differed little from those erected by their peoples before the Roman domination; the Romans exerted an influence on the mode of construction of houses only in certain provinces, in Provence, and a small part of Lyonnais, Languedoc, Saintonge, Angoumois, Perigord and a part of Burgundy. Besides that everywhere traditions dating back to high antiquity were preserved, and about the 14 th century, except in Provence and Languedoc, occurred a reaction definitely antiroman, from the point of view of the construction of habitations. It would appear that at that epoch the old Gaulish nation returned in building its houses to an art, whose principles had remained in a latent state. Secular feudalism, far from restricting that movement, on the contrary seems to have aided it, certainly not because ofa particular t taste for a form of art, but because of its secret hate of m monastic institutions, that as we have said above, had retained Gallo-Roman traditions quite purely. The middle ages consists of very different and of frequently opposed elements; it is difficult without entering on long explanations to render ay account of the effects, singular in appearance, that were produced suddenly within peoples continually at work. In the habitation of the citizen and of the man of the country, as much as in the political history, one finds traces of the national movement, that commenced during the reign of S. Louis, and that continued with marvellous activity during the 14 th and 15 th centuries, through that time of invasions, wars and miseries of all sorts. It seems that then the inhabitants of the cities, that possessed the practice of the arts, sought in all constructions to depart from the traditions preserved by the monasteries; they returned to wooden construction, and devoted themselves to bold combinations, that carpentry allows; they opened more and more the facades of their houses, so as to compose the stories of open fronts, that seemed to make t the life of the citizens in common. It necessarily produced from this intimate vicinity a more complete fellowship between the citizens; without being obliged to descend into the p public street, they could hear each other and plan together. In certain streets of the 14 th century, the occupants of the houses formed a cabal by opening their windows. This political need of agreement made necessary by the state of the struggle

of the citizen class against clerical and secular authority, explains those arrangements of houses, that seem so odd to us today, whose houses with very open facades form impenetrable streets, and which nearly touch at the ridges, leaving at their bases a passage very easily intercepted. The great question for the citn then was concentration, the union of means and the complete understanding at a given moment; then forced to group the houses as much as possible, and to place their inhabitants in direct communication. Facades of carpentry lent themselves much better than those of masonry to those concentrated arrangements and to that system of open fronts; further, they occupied less of that so precious land. These is then no reason to be surprised, if among the urban peoples that had acquired at the 13 th century privileges and a certain independence, who had become industrious and rich, that construction in wood had been almost exclusively adopted. In the cities of the South, in which the traditions of the Roman municipility were never entirely lost, and which had not been forced to react violently against the feudal power, particularly against the clerical feudal power, that had become heavier for the cities than the lay authority, domestic architecture retained the masonry construction, the arrangement of relatively wider streets, and did not adopt those entirely open facades, that so to speak, placed all the inhabitants of the city in contact with each other.

We have just stated that the clerical feudal power then weighed more heavily on the cities of the North than any other. One recalls how the bishops about the end of the 12 th century were preoccupied with the exaggerated importance assumed by the monastic establishments, which had absorbed for their benefit a grea part of the diocesan authority on the one hand, and beiug desirous of encroaching on the lay feadal power on the other hand, had an understanding with most of the great cities situated North of the Loire,[1] to erect cathedrals that should become the monument of the city, in which the inhabitants could assemble at their pleasure, discuss public affairs and have their lawsuits judged;[2] how the bishops thus hnped to destroy the colossal power assigned to the abbeys, and lessen that of the lay lords; how that attempt was at first seconded with extreme ardor by the cities, but partly failed as a res-

result of the protest of four barons delegated in 1246 to the king Louis IX, and by the establishment of the royal bailiffs; yet how the citizens formed a more intimate alliance with royalty, that they felt thenceforth the protecting power, abruptly ceased to assist the construction of those immense basilicasl, to struggle against the feudal power of the bishop and c chapters, until then the most extended in the city. That struggle was often sustained by the lay lords and tolerated by t the royal authority, when if found therein a means of extend- its own authority, had as a result the maintenance in the midst of the people of those cities an incessant fermentation, a and of giving them an idea of its strength, if it remained w united. Hence those habitations so intimately connected and so near, all constructed on nearly the same programme followed until the end of the 15 th century.

Note 1.p.260. Noyon, Senlis, Paris, Bourges, Chartres, Rouen, Sens, Arras, Amiens, Cambrai, Rheims, Laon, Soissons, Beauvais, Auxerre, etc.

Note 2.p.260. Because of this reasoning, "that the Church by virtue of a power that God had given to it, must take cognizance of all that sinned, so as to know whether it should remit or retain, bind or loose." This was certainly an encroachment on the judicial power of lay feudalism in general.

It is always necessary for us to enter into the customs of the middle ages when we desire to find the reason for its architecture. The Romans spent a great part of their time in t the public monuments, the basilicas, under the porticos, in the baths and the edifices intended for sports, theatres, circuses, amphitheatres, etc. Although in our days the great cities contain many public monuments, still when one looks at the plan of ancient Rome, on which the monuments occupy such a g great comparative area, one asks where such a numeross population lodged; the Romans scarcely lived at home except to eat and sleep (we do not speak of those possessing immense palaces, whose areas occupied a considerable space). On the contrary in the middle ages, in cities of the north of France, each fa family lived in its house; the citizens had no occasion to assemble, and had the cities been sufficiently rich to erect n numerous public edifices, the principle of feudal government would have been opposed to this. The church was the sole mon-

Note 1.p.241. Arch. cin.et dom. of Mr.Verdier et Cottin.

Note 2.p.241. The little columns of the second story of th-

monument of the city in which the assemblage of citizens was permitted; thus is explained the enthusiasm with which populous cities came to the aod of the bishops, when they projected the construction of great cathedrals. But when that outburst was suddenly stopped, the citizens found in the royal authority serious guarantees, they began to erect habitations with entirely new ardor, and wood lent itself marvellously to the quick satisfaction of those needs; econocy, and still more important, the small area occupied by the solids. Everywhere also till the end of the 16 th century, architecture followed its regular course, improving the houses, making them lighter and more commodious, but continued to employ Romanesque methods. The form alone vas modified. One sees in Burgundy, Lyonnais, Limousin, Perigord, Auvergne and Languedoc, houses of the 14 th and 15 th centuries, which differ from those of the 12 th and 13 th centuries only by the style of their architecture.[1] Neither the construction nor the arrangement of those habitations is modified in a sensible manner. In the most southern provinces also, that which in the 14 th century was not French, were seen at that epoch habitations, whose style absolutely retained the Romanesque character. For example, such are some houses of the city of Perpignan; one of those houses, since devoted to the service of the palace of justice, presents a facade in a taste nearly antique, in spite of the details borrowed from the Arragonese style of that epoch.(24).[2] At the eastern side the traditions of Romanesque construction continue till very late in the habitations, i.e., till the 15 th century. Certain houses of Treves, Cologne and Mentz, that were erected at the beginning of the 13 th century, could pass for Romanesque houses in Ile-de-France and Champagne. One even yet finds in some of those habitations particular arrangements, which belonged in France only in the 12 th or beginning of the 13 th centuries; for example,such are fireplaces with flues corbelled out beneath the front walls above the second story (Art. Cheminee). We give (25) the facade of one of those old houses of the city of Treves, that dates from the beginning of the 14 th century, and that shows its chimney in the middle of the gable wall on the street.

Note 1.p.261. Arch. civ.et dom. of MM.Verdier et Cattois.

Note 2.p.261. The little columns of the second story of th-

this house are of marble; the rest of the facade is built of rubble and brick rubble. The bill makes the suggestion (which is of the doorjambs of the central doorway, the pilasters of the lateral openings of the ground story. These are the remains of architraves very far removed from those of the Renaissance of the north.

The matter is placed in intimate relation to the fragment A of the plan, and the line is terminated by the one 8 that rests on a lower rectangle in the form of pilasters and an one lightly struck between the windows of the second story. It must be quite plain that while wishing to retain the view particular, Tiberius at the good period working near the fireplace, and to make one's self thereby better intermediary by interpretation of the times. The persons in that time thus had their comfort, and from what we know of accommodating ourselves today, it does not follow that ours may be more widely unnecessary. However optimistic a that comfort, as least the architecture was definitely without in it, while today our architecture (at least what is in Europe) is recognized as it ought to be a universal language of our habits in interiors.

Let us return to the Roman of Trajan either or the if it not if or occasions. Foot imitably considered in their construction at that occasion, and generally public walls present themselves on the street, the idea arrangements for building having certain double idea limits, by the greater tolerability of circle, that the front of the site is most urgent. Yet if the site be a border, which somewhere occurred, the side walls were placed on the party walls, and the front half three well on the street was the save well. Here (26) is a house of Ravenna[1] presenting that arrangement. On the ground story was a portico with shop behind it, as one still sees at Rimini.[2] The second story on the street consists of two rooms, to which access is the outer stairs placed it the wall of the passage A. Between the roof was a great room lighted by two doorways, one on the street and the other on a little court. That column into the terminus of the if is unusual. There are quite some examples of this that is Pompeii, especially the atrium.

Note 1.p.255. The house existed on the square of Ravenna in 1884, at the eastern side.

this house are of marble; the rest of the facade is built of stone and small rubble. One will note the exaggerated jointing of the voussoirs of the central doorway, the platbands of the lateral openings of the ground story. These are the remains of traditions very far removed from those of the provinces of the north.

The hearth is placed as indicated by the fragment A of the plan, and the flue is terminated by the cap B that rests on t three corbels in the form of capitals and on two little arches between the windows of the second story. It must be quite pleasant while warming to enjoy the view outside. Windows so pierced permit working near the fireplace, and to warm one's self without being inconvenienced by the reverberation of the flame. The persons in that time thus had their comfort, aod from what we know of accommodating ourselves today, it does not follow that ours may be wore wisely understood. However primitive t that comfort, at least the architecture was entirely subject to it, while today our architecture (at least what it is desired to persuade us is ours) is in a perputual discord with our habits in interiors.

Let us return to the houses of French cities of the 14 th and 15 th centuries. Wood decidedly dominates in their construction at that epoch, and generally gable walls present themselves on the street, the lots suitable for building having greater depth than breadth, by the reason dominating all cities, that the front of the site is most prized. Yet if the s site be a border, which sometimes occurred, the gable walls were placed on the party walls, and the front half timber wall on the street was the eave wall. Here (26) is a house of Beauvais [1] presenting that arrangement. On the ground story was a portico with shop behind it, as one still sees at Rheims.[2] t The second story on the street consists of two rooms, to which one ascends by the screw stairs placed at the end of the passage A. Beneath the roof was a great room lighted by two dormers, one on the street and the other on a little court. That house dated from the beginning of the 15 th century. There yet exist some houses of this kind at Orleans, excepting the portoco.

Note 1.p.265. This house existed on the square of Beauvais in 1834, at the eastern side.

Likewise here (27) is a house of Ponon in half timber work in 4 stories, a little earlier than the preceding, i.e., belonging to the first half of the 15 th century, and that from the angle of two stories.[1] The half timber frame of each story is corbelled out from the corners (see section A), so that the entire story has an area somewhat larger than that occupied by

Note 2.p.265. Of a later epoch.

After the war of independence in the 15 th century, when the English were compelled to abandon the North and West of France, there was under Louis XI a pronounced movement of prosperity in the urban peoples. Private structures arose in great number at Paris, Rheims, Orléans, Beauvais, Rouen, in all cities of Normandy, Picardy and Ile-de-France. Because of this need of building, land acquired a considerable value, and while l leaving free circulation at the ground story by suppressing even the porticos, whose piers or posts were an obstruction, the facades were corbelled into the street from the level of the floor of the second story. These facades thus became actual galleries, wide and giving the stories up to 6.6 ft. projection beyond the front of the substructure. The fronts of t the shops were therefore perfectly sheltered. This system of construction was particularly adopted at the ends of the streets on market squares, nearly always surrounded by posts.

One still sees at Rheims [3] a house with facade of half timber work, perfectly preserved from top to bottom, projecting 5.4 ft. into the public street (26 bis), corbelled out on 5y strong braces. At one side a party wall A of stone supports the fireplaces, and its supporting pier receives two braces. At the other the party wally is only a simple half timber framework. The wooden statues attached to the corner post near the stone pier no longer exist; but the two lower end braces are sculptured in half relief, at one side being Samson slaying the lion, at the other S. Michel beating the demon. This front framing forming a projecting gallery, since it receives side light, is constructed with great perfection; indeed its connections must be perfectly arranged, since the carpentry has suffered no deformation, although in its entire height are no X-braces. The spaces between the posts are filled by masonry and plaster.

Note 3.p.265. Place des Marches.

Likewise here (27) is a house of Rouen in half timber work in 4 stories, a little earlier than the preceding, i.e., belonging to the first half of the 15 th century, and that forms the angle of two stories.[1] The half timber frame of each story is corbelled out from the others (see section A), so that the third story has an area sensibly larger than that occupied by

[illegible] nance a series of reconstructions.

Note interesting was the [illegible] of this house as furnished by M. Doerer, architect, who at the Salon of 1921 exhibited several old houses of Rouen and of Orleans drawn with extreme care. The ministry of State, at the request of the committee of historical monuments, also caused a certain number of these houses of Orleans to be drawn by M. Voudoyer.

In the 15 th century the windows of wooden houses are multiplied and small; that was a necessity of construction, therefore even the half timber frame assumed a great height. This use this sort of structure, by even the nature of the material employed, is subject to bending. Great spaces of windows must [illegible] ment of the wooden timbers. It would have been consequently necessary to remove and refit them, while small spaces were less affected by changes in temperature, or more exactly followed the movements of the carpentry. Besides, one notes that the sills of these windows being carefully fitted with X-braces [illegible] of the half timber frame is transferred to the corner posts by being relieved at each story. But the inhabitants of these houses of the Rouen school more and more to open these wooden [illegible] de nouvel lanterne, as proved by the example opposite (29). also taken from a house at Rouen. Only the sills were their X-braces prevent the swaying of the wooden frame, also reduction the production of a work of joinery. Thus also at that [illegible] upon the Rouen house lean the character of a carpentry construction to take that of furniture, of an immense chest.

[illegible] the work of M. Doerer.

In Fig. 28 the masonry panels below the sills are still visible; soon these disappear behind panels of joinery, and the entire front of the house only presents an assemblage of woodwork. On this panel were built many houses at the end of the 15 th century and the beginning of the 16 th.

Fig. 29 represents the part of the restoration of the entry of S. Amand at Rouen, and shows above a ground story of masonry two stories entirely of wood, crossmarked externally by cas-

the ground story. The cornice at the base of the gable represents a series of machicolations.

Note 1.p.266. Rue de la Tuile. The drawing of this house w was furnished by M. Devret, architect, who at the Salon of 1 1861 exhibited several old houses of Rouen and of Orleans drawn with extreme care. The ministry of State, at the request of the committee of historical monuments, also caused a certain number of those houses of Orleans to be drawn by M. Vaudoyer.

In the 15 th century the windows of wooden houses ar multiplied and small; that was a necessity of construction, therefore when the half timber frame attained a great height. Indeed this sort of structure, by even the nature of the material employed, is subject to bending. Great sashes of windows would frequently have been deformed, compressed or bent by the movement of the wooden timbers. It would have been constantly necessary to remove and refit them, while small sashes were less affected by changes in temperature, or more readily followed the movements of the carpentry. Besides, one notes that the sills of these windows being carefully fitted wit X-braces prevented the movement of the door posts, and that the weight of the half timber frame is transferred to the corner posts by being relieved at each story. But the inhabitants of those cities of the North sought more and more to open these wooden facades. At the end of the 15 th century frequently, they made actual lanterns, as prowed by the example opposite (28), also taken from a house at Rouen.[1] Only the sills with their X-braces prevent the swaying of the wooden frame, also made with the precision of a work of joinery. Thus also at that so epoch the wooden house loses the character of a carpentry construction to take that of furniture, of an immense chest.

Note 1.p.268. Rue Molpolu. We also borrow this drawing from the work of M. Devret.

In Fig. 28 the masonry panels below the sills are still visible; soon these disappear behiud panels of joinery, and the entire front of the house only presents an assemblage of woodwork. On this basis were built many houses at the eud of the 15 th century and the beginniug od the 16 th.

Fig. 29 reproduces the part of the habitation of the abbey of S. Amand at Rouen, and shows above a ground story of masonry two stories entirely of wood, ornamented externally by car-

carved panels of joinery. When a little later with the Renaissance men returned to stone structures, that habit was so strongly retained, that there were built a great number of wooden houses, but ou which were found however the forms of pilasters and bands, that did not belong to the system of construction in carpentry. There still exists in Rue de la Grosse-Horloge at Rouen two houses of this kind, that are covered by precious details. We give (30) a part of one of them.[1]

Note 1.p.240. These houses also form a part of the work of M. Devret, but will soon disappear by reason of cutting a new street. It is to be desired that these precious facades should be deposited under shelter in some public monument of the city of Rouen.

The 16 th century saw erected also such stylish houses, the last reflection of the art of the middle ages. After the disasters of the end of that century, the houses returned to the simpler style, but the plans were modified very little, and many houses of the time of Henry IV and of Louis XIII reproduce exactly the plans of the earlier habitations. It was only under the reign of Louis XIV, that the houses (we are not speaking of the mansions) lose all external character. Then nearly all walls are plain or are timber frames with panels filled with roughcast, pierced by rectangular windows, without anything to occupy the eyes; but the interiors are also profoundly modified.

The hall, that we also find in the habitations until about the beginning of the 17 th century, gives place to the chambers. The areas are divided; each man wishes to be by himself, and the customs of life in common disappear. One understands how a family became attached to its house, when the common hall, that even served for the chamber of the masters, had seen the birth aud death of several generations, had witnessed festivals in its interior, had long been trodden by the feet of friends; one comphehends then how each citizen held to having his house pleasant and decorated; but one does not understand the luxury spread over the facades of ordinary houses, in which the occupants left but a fleeting memorw. Naturally the appearance of those houses must be as common as t their use. From the point of view of art, is that an advance?

From the examples of urban habitations that we have presented

in this Article result a series of interesting observations. The individual character of these houses is striking; now we range ourselves with the opinions of those, who claim that t the moral condition and its vitality are by reason of more or less responsibility left to each one. The true civilization, that civilization distinct from a policed state, fertile and active, is that in the midst of which the citizen retains the fullness of his individuality. The theocratic or despotic civilizations of the East are destined to cast a brilliant gleam at a given moment, then to gradually become extinct, to never rise again. There indeed the citizen does not exist; there is the sovereign, the theocracy or the aristocracy, then a multitude of men whose passage is only marked by those prodigious monuments, like those of Egypt, India or of Asia Minor. In s such a state the house does not exist; between the palace and the mud hovel is no intermediary, and again all the mud huts resemble each other in form and dimensions. To the northern races that emigrated to the West, taking wit them those great wagons containing their families, actual rolling houses, that were fixed on the ground on the day that the tribe conquered a place, to those races alone, the Greeks of antiquity at their head, it was given to build houses, i.e., habitations indicating the habits and tastes of each one, modifying them in accordance with the changes operating in those habits and tastes. The feudal system was indeed imposed on France by conquest, although repugnant to the Gallo-Roman peoples, was not made to destroy individualism, personal responsibility. on t the contrary, it developed with energy this sentiment natural to the western peoples, it established the struggle for a permanent state, it allowed a last recourse against oppression by the employment of the feudal mechanism itself; for every individual oppressed by a lord could always resort to the sovereign, and every municipality could, sometimes joining the party of the bishop, sometimes that of the lay baron, make a final appeal against tyranny. That certainly was not a regulated and policed state, as we understand it; but neither was it a state contrary to the intellectual development of the i individual. Thus the individual was something in the cities of the middle ages, and consequently his habitation retains a d definite and recognizable character.

absolute government of Louis XIV almost entirely still-
[illegible] of the Roman Empire that all individual [illegible]-
[illegible] of monarchy. The sign-[illegible] [illegible] g [illegible]-
ly astonished. Unhappy souls, cooped up crowded, those be-
dwellings scorned the citizens, who lose on entering all in-
dividual consciousness and no longer recognized themselves, so
to speak, except by the names of masters and masters. So we
see that in Rome, where the feeling of personal responsib-
ility, of the distinction of the individual was much better
preserved than among us, the inmates of the great circus,
if they possessed nobody nearly similar in appearance, at least
so passed them by families, and only also difficulty left to-
themselves to that assemblage of monstrous renders in the sate
mobilization. This fact seems to us to have a moral significan-
ce of high importance, and it is not without lively satisfac-
tion, that we see in our days such feeling of the distinction
of the family, of individualism, take possession anew of men,
[illegible] under the [illegible] [illegible]
under the government of Louis XIV.

Everyone desires to have his house; now if the vast majori-
ty of the inhabitants of our great cities cannot yet satisfy
[illegible] in the city, at least let are seek to free himself
from the bad conditions of the common dwellings by erecting
[illegible] [illegible]
[illegible], and in union even families with small fortunes can [illegible]
[illegible] [illegible] [illegible]
the existing government of France, to have known how to take
the most radical measures to arrest this baleful tendency of
minds: for in our opinion the Paris cannot call itself morall-
ly civilized until the day, when each citizen will possess his
proper residence, in union he can raise his family, where he
will leave the memories of the good that he has been able to
do, or the services that he has rendered to his neighbors. T
he walls speak, and a man that would do a shameful act in t
the rented lodging, that he will leave in six months, will h
esitates between the walls belonging to him, and where his
children will grow up, to leave himself to his evil tendencies.

It is now necessary for us to speak of manners, i.e., of
[illegible] [illegible] [illegible] [illegible]

The absolute goveenment of Louis XIV almost entirely stifled that sentiment so active until the end of the 16 th century, and the house of the French citizen lost all individual characterin the 17 th century. The city habitation became a family storehouse. Uniformly built, opened or arranged, those dw dwellings absorbed the citizens, who lost on entering all individual appearance and no longer recognized themselves, so to speak, except by the names of streets and numbers. So we see that in England, where the feeling of personal responsibility, of the distinction of the individual was much better preserved than among us, the inhabitants of the great cities, if they possessed houses nearly similar in appearance,at least possed them by families, and only with difficulty lent themselves to that assemblage of numerous renters in the same habitation. This fact seems to us to have a moral significance of high importance, and it is not without lively satisfaction, that we see in our days this feeling of the distinction of the family, of individualism, take possession anew of men, and react against the enervating system introduced into France under the government of Louis XIV.

Everyone desires to have his house; now if the vast majority of the inhabitants of our great cities cannot yet satisfy that taste in the city, at least let one seek tofree himself from the bad conditions of the common dwellings by erecting those myriads of little suburban houses, that occupy our suburbs, and in which even families with small fortunes can pass a good portion of the year. It will be one of the glories of the existing government of France, to have known how to take the most radical measures to arouse this healthy tendency of minds; for in our opinion the State cannot call itself morally civilized until the day, when each citizen will possess his proper residence, in which he can raise his family, where he will leave the memories of the good that he has been able to do, or the services that he has rendered to his neighbors. T The walls speak, and a man that would do a shameful act in t the rented lodging, that he will leave in six months, will h hesitate between the walls belonging to him, and where his children will grow up, to leave himself to his evil tendencies.

It is now necessary for us to speak of mansions, i.e., of city houses belonging to lords or to wealthy private men, and

and that served for the habitation."[1]

Note 1.p.275. Arch. cho. et dom. by Verdier & Cattois. Vol. II. p. 295.

that occupy quite extended areas, which enclose courts and ga even sometimes gardens, but which do not affect the defensive arrangements of the feudal castle, and that are not equipped with towers and crenelated walls. As we stated in commencing this Article, the mansion does not habitually have its living apartments on the public street, but rather the common rooms and dependances, and sometimes a simple wall with the porter's lodge. As the citizens and the merchants adhere to participating in the daily life of the street (further it is for most of them a necessity), so the noble and the wealthy capitalist at the head of many attendants adhere to shutting themselves within their houses, to live a feudal life in the city, isolated, having no habitual communication with the exterior. The character of the mansion, or if one prefers, that of the house of a noble, then differs entirely from the house of the c citizen. This kind of habitation has been compelled to suffer even more changes than the houses of the citizens. Occupying larger areas, having successively belonged to wealthy persons, they have been modified according to the taste of the day; we no longer find in France mansions preceding the 15 th century, or at least the remains left to us have but a mediocre value.

One of the oldest of those mansions is still seen at Provins; it belonged to some rich canon of S. Quiriace. It consists (31)"of two distinct buildings, separated by a vaulted passage. At the left is found the great reception hall placed in the second story; this is reached from the court by an external stairs of wood. Three double windows opened in the facade opposite the church and light this room; it was warmed by a great fireplace of stone, and covered by visible carpentry wi with a trussed ceiling. At the right of the passage is found the kitchen and two rooms placed between the court and garden, and that served for the habitation." [1]

Note 1.p.275. Arch. civ. et dom. by Verdier & Cattois. Vol. II. p. 205.

In some of the flourishing cities of the South, scarcely k known today, there exist habitations of the 13 th and 14 th centuries, that partake of both the mansion and the house. T The rich capitalist of those municipalities on the banks of the Garonne, Aveyron, Tarn and Lot, withing which Gallo-Roman traditions were very well preserved, when he built his mansion,

[illegible] to have disappeared as the street, which far was in its own measure to be lost. Thus about structures were [illegible] as Tailors, Jiby, T. Bakers, Tavern, Smiths and Tiles-[illegible] Shops.

Th-Jiew [27] the plan of one of these merchts situated in the main street of the Jaia of Sumbra overlooks the [illegible] of Erie.

On the right and left of the entrance A are the storerooms or shops opening on the street. At F is the principal court and at C is a little service court reached by a passage D. In the open room E probably served as a stable. F is a cellar. A wide straight staircase [illegible] leads to the great hall H in the ground story, raised seven steps above the ground of the court. A passage I communicates with a garden K, situated outside the old rampart wherein is built the mansion. Buildings of a late epoch have been partly erected on the [illegible] from A to E. The [illegible] and [illegible] that the court and probably those occupying them lodged elsewhere, unless these storerooms were for the use of the owner of the mansion. The great staircase G ascends to the second story in a hall situated over H, and communicates by a wooden passage V with the front building which was only divided by partitions. A ruined story also rose above this front building, and was separated by the grand staircase and a second passage. The stable and the cellar only had a ground story. A little [illegible] T with flight of steps opens on the court opposite the hall H.[2] This habitation dates from the first years of the 14 th century, and has all the characteristics of the mansion of the middle ages, although the shape seen on the street, and the front building [illegible] the [illegible] in the [illegible] stories.

Note 2.p.275. These plans were drawn by M. Thomas, architect of Tors. M. Thomas has made a very interesting work on the [illegible] of Jaia, [illegible] in the archives of the [illegible] institutions.

The data that are the subject of the [illegible] of the 13 th and 14 th centuries in the cities of the North are not sufficiently complete to allow us to give plans of these habitations. We shall only state that they [illegible] with corridors on one or two sides, and a building reared and looking

desired to have storerooms on the street, either for use in his own business to to let. Those mixed structures were frequent at Toulouse, Alby, S. Antonin, Cordes, Gaillac and Villeneuve d'Agen.

We give (32) the plan of one of those mansions situated in the main street of the city of Cordes opposite the promenade of Bride.

On the right and left of the entrance A are the storerooms or shops opening on the street. At B is the principal court and at C is a little service court reached by a passage D. Th The open room E probably served as a stable. F is a cellar. A wide winding stairway G gives admission to the great hall H in the ground story, raised seven steps above the ground of the court. A passage I communicates with a garden K, situated outside the old rampart against which is built the mansion. Buildings of a late epoch have been partly erected on the garden from a to b. The shops L L had access into the court and probably those occupying them lodged elsewhere, unless these storerooms were for the use of the owner of the mansion. The great stairway G ascends to the second story in a hall situated over H, and communicates by a wooden passage M with the front building with area only divided by partitions. A third story also rose above this front building, and was served by the grand stairway and a second passage. The stable and the cellar only had a ground story. A little terrace N with flight of steps opens on the court opposite the hall H.[2] This habitation dates from the first years of the 14 th century, and has all the characteristics of the mansion of the middle ages, although the shops open on the street, and the front building serves for lodgings in the second and third stories.

Note 2.p.275. These plans were drawn by M. Thomas, ex-architect of Tarn. M. Thomas has made a very interesting work on the houses of Cordes, deposited in the archives of the monuments historiques.

The data that one can collect on the mansions of the 13 th and 14 th centuries in the cities of the North are not sufficiently complete to allow us to give plans of those habitations. We shall only state that they contained courts with porticos on one or two sides, and a building retired anf looking

on the court and on a garden, with the offices placed in the vicinity of the stables. The chief apartments of state were kept [illegible] entirely in the western [illegible]. It is not a fact generally known to the public that [illegible] the right. Indeed Louis Quatorze enjoyed this princely residence.

Note 1.p.276. By a charter of 1224, Louis VIII permitted the [illegible] to build in the [illegible]. Subsequently towers and curtains thus become private property. In 1418 Jacques Coeur purchased this [illegible] [illegible] the fragment comprising two towers of the ramparts of Bourges on which he built his mansion. (See Antho. et Les Mons. du Berry, by Hugo. 1884.

We give (34) the plan of the ground story.

The towers A, B and C formed a position of the ramparts of the city and were utilized. D was occupied by a iron cornelated pavilion, and the stairs to it was thus attached to the tower E. The arrangement of the rampart formed a very odd angle [illegible] [illegible] [illegible] [illegible] [illegible] not to give to his outlines the exact arrangement, that we see reproduced in the construction. But then little attention was paid to symmetrical combinations, and men profited by the site as much as possible. The entrance to the mansion is at A on the street, and consists of a gateway with a postern B at the side; one stairs F assends to the only it looked over the gardens. Look from the exterior it was easy to reason that C contain without entering the interior of the residence. From the entrance A for carriages or riders, and from the postern B, one entered the great court C rather an enclosed portico D and passed that at G. The last portico opened on a court C, having a party wall C'. At H is the principal staircase, giving in the ground story [illegible] [illegible] a service passage J, communicating with the kitchens situated in K and K'. The kitchens K' had a postern with freepiece and a stove for soup. From the stairs one could directly reach the kitchens by the corridor L and the little service court L', connected with the great court by the passage L". The great hunting hall was reached by an immense freplace O, and was connected by the little gallery L' intended for musicians. The last gallery was reached by the stairs F without passing through the hall. On the floor of the hall I a trapdoor i have a

on the court and on a garden, with the offices placed in the vicinity of the street. The oldest edifice of this kind still entire is the mansion of Jacques Coeur at Bourges. It is on a fief established on the walls that enclosed the city, that Jacques Coeur erected this splendid residence.

Note 1.p.276. By a charter of 1224, Louis VIII permitted the inhabitants of Bourges to build on the ramparts. Several towers and curtains thus became private property. In 1443 Jacques Coeus purchased from Jacques Belin for 1200 crowns the fief c comprising two towers of the ramparts of Bourges on which he built his mansion. (See Antiq. et les Mons. du Berry, by Hoze. 1884.

We give (33) the plan of the ground story.

The towers S, R and Q formed a portion of the ramparts of the city and were utilized. S was crowned by a rich crenelated pavilion, and the stairs to it was thus attached to the tower Q. The arrangement of the rampart formed a very obtuse angle on which the face of the wall was built, obliging the architect to give to his buildings the skew arrangement, that we s see reproduced in the constructiou. But then little attention was paid to symmetrical combinations, and men profited by the site as much as possible. The entrance to the mansion is at A on the street, and consists of a gateway with a postern B at the side; the stairs F ascends to the chapel located over the entrance. Thus from the exterior it was easy to reach that c chapel without entering the interior of the residence. From the entrance A for carriages or riders, and from the postern B, one entered the great court C under an enclosed portico D and beneath that at E. The last portico opened on a court G, having a party well G′. At H is the principal stairway, giving entrance in the ground story to a great dining hall I and a service passage J, communicating with the kitchens placed in K and K′. The kitchen K′ had a hearth with fireplace and a stove for soup. From the street one could directly reach t the kitchens by the corridor L and the little service court L′, connected with the great court by the passage L″. The great dining hall was heated by an immense fireplace c, and was accompanied by the little gallery I′ intended for musicians. Th That gallery was reached by the stairs f without passing through the hall. On the floor of the hall I a trapdoor i gave a

access to the gallery. Thus Wynkoop was rewarded the day was of the better, who could thus bring the foeman wide directly into the hall at the time of the repast, or indeed as some claim, it operated his by what has always been the cal-
lar in case of fire; this we cannot decide. The great fresco
[illegible] at Pl. T. and the crazy arrangement was
[illegible] a fortuitous way, and at the two sides the
nude statues of Adam and Eve were separated by the tree of K
nowledge. M was the pantry from which by a tunnel a the dres-
sed fishes were passed into the hall. The little servant st-
airs round in that pantry descended into the lower story of
the tower S, which thus served as an entry to the pantry. De-
scending into the little kitchen X is seen the oven and a vast-
ness lavatory, paved and with a grotesque ancient in a cassock.
Privies for the servants are [illegible] lavatory un-
der the solid stairway. A stairs D connected that kitchen wi-
th a mezzanine of the tower S, and a second story by means of
the screw stairs t. The lirtle court T' has a fine well with
cover, permitting the filling of tanks arranged in the dress
kitchen K. From the kitchens the meats were brought into the
[illegible]
connected the great court with the place of Jerry P. As T T'
[illegible]
their position appear to have served as chambers with verdro-
be placed in the square tower P. That entire angle, including
the tower S, formed a complete and independent apartment, si-
nce one could descend from the great chamber T' into the lit-
tle court by a stairs t, or ascend to the upper stories. The
porter's lodge was at V. As for the gallery D, it served as a
[illegible]
one remains from the table of Jacques Coeur. The poor knew not
to access into the mansion, and could shelt under shelter, a
[illegible] from the kitchen was dropped what was reserved for them.
The stairs X, H, O and S ascend from the ground to serve the
upper stories.

If this plan be irregular, one should recognize that its a
[illegible] is well understood. Each service is in its place,
the communications between them are easy and yet are respon-
sive. On the right of the entrance is the kitchen service with

access to the cellars. That trapdoor was reserved for the use of the butler, who could thus bring the fresh wine directly into the hall at the time of the repast, or indeed as some claim, it permitted him to cast the silver ware into the cellar in case of fire; this we cannot decide. The great fireplace had an opening of 19.7 ft. and was richly ornamented; its mantle represented a fortified city, and at the two sides two nude statues of Adam and Eve were separated by the tree of k knowledge. M was the pantry from which by a wheel m the dressed dishes were passed into the hall. The little straight stairs noted in that pantry descended into the lower story of the tower S, which thus served as an annex to the pantry. Opening into the little kitchen K is below the oven and a vaulted lavatory, paved and with a gargoyle ending in a cesspool. Privies for the servants were placed beside that lavatory under the solid stairway. A stairs n connected that kitchen with a mezzanine of the tower S, and a second story by means of the screw stairs t. The little court L′ has a fine well with spout, permitting the filling of tanks arranged in the great kitchen K. From the kitchens the meats were brought into the pantry by the passage J, that ended under the grand stairway H. Passing beneath the stairs O one found a corridor directly connecting the great court with the place of Berry P. At T T′ are two great rooms, whose purpose is unknown, but which by their position appear to have served as chambers with wardrobe placed in the square tower R. That entire angle, including the tower Q, formed a complete and independent apartment, since one could descend from the great chamber T′ into the little court by a stairs g, or ascend to the upper stories. The porter's lodge was at V. As for the gallery D, it served as a place for the assemblage of the poor, to whom were distributed the remains from the table of Jacques Coeur. The poor thus had no access into the mansion, and could await under shelter, u until from the kitchen was brought what was reserved for them. The stairs X, H, O and g ascend from the ground to serve the upper stories.

If this plan be irregular, one should recognize that its a arrangement is well understood. Each service is in its place, the communications between them are easy and yet are independent. On the right of the entrance is the kitchen service with

its court, its special exit and its great portico for the distribution of alms. Opposite is the principal stairway for the upper apartments and the dining hall of the ground story. On the left is a complete and independent apartment with its court and its portico permitting private entrance or exit. Many mansions of the 17 th century are far from presenting arrangements as convenient and well studied.

Fig. 34 traces the plan of the second story of the mansion of Jacques Coeur. The principal stairway A gives entrance to the great hall B, which has a platform like the great halls of castles. The living apartments were at C; they were placed in communication with the great hall B and with the gallery D by service passages and direct exits. From the gallery D one passed to the chapel E, to which one also ascended directly from the lower vestibule by the stairs F. Another gallery G likewise connected the chapel with the hall I and the separate apartment K, which had a private stairs L. The service of the principal apartment C was by the stairs M or by the stairs X. The salon I found an exit by the stairs N, the great hall B itself, besides the grand stairway, was served by the second stairs O. In the second story as in the ground story, the different services of that mansion were made independent, and t the rooms intended for receptions could not interfere with t the private arrangements of the inhabitants. As in the castles, one sees that the programme compelled the architect to find combinations of very complicated plans to satisfy the tastes or particular needs of the owner. It is certain that the numerous lobbies were disguised and appeared indispensable, and that all idea of symmetry was sacrificed to the requirements of the habitation as then understood. One will note that the apartments intended for habitation, besides the great rooms, consisted of numerous lodgings, cabinets and wardrobes, that could not fail to be very convenient; that all these rooms, great and small, are lighted.

By utilizing the Gallo-roman towers and ramparts, Jacques Coeur was perhaps not sorry to give his mansion the appearance of a feudal domain, and in great part the retaining of those towers required the irregularities of this plan. Besides, the architecture adopted lends itself to those defects of symmetry, and nothing is more picturesque or more brilliant,

than the interior of that court with its stair towers, its se separate roofs surmounted by chamney caps, finials, dormers, and lead crestings, formerly painted and gilded.

We present (35) a cavalier view of that mansion taken from the point P″,(see plan of ground story). The construction is everywhere treated with extreme care and the sculpture is in a charming style, appropriate to each service, mingled with emblems, devices, hearts, plumes and shells. Thus over the three openings of the chapel stairs, in the tympanums, the sculptor has placed a priest clothed in the alb and blessing the water; behind him a young cleric rings for the mass; then comes the beggar leaning on a crutch, as if to indicate that the holy place is accessible to all. The second relief represents the clerics preparing the altar. The third a woman arriving for the office, preceded by a child, that opens the door. At the top of the stairway is a fourth relief representing the Eternal Father with two angels in adoration. Above the doorway of the stairs is sculptured a wide fireplace before which hangs a kettle, a child turns the spit, a woman washes the dishes, and the cook pounds spices an a mortar.

Among the devices on several tympanums, or painted on the glass is read the following:- "To brave hearts nothing is impossible." Then these enigmatic words:- "God to do to be silent for my joy." Or indeed this proverb:- "Into the closed mouth enter no flies." Jacques Coeur had adopted as arms:- azure with band or charged with three shells sable, accompanied by three hearts gules placed 2 in chief and 1 in point.

The vaults of the chapel are entirely painted; in each triangle of that vault is an angel clothed in white holding a scroll, and detached from a blue ground with gold stars. One knows how the illustrious parvenu capitalist of the 15 th century paid dearly for this magnificence. The man is one of the most remarkable individuals of our country. This habitation is then an edifice interesting from all points of view, among those that we possess in France.[1]

Note 1.p.281. This charming edifice was converted into a palace of justice, and has suffered numerous mutilations. Now placed in the hands of one of our mosh distinguished colleagues, M. Bailly, we are assured that it will be restored with the care and respect, that it merits.

is have now come to the end of the 15 th century, and so a [illegible] of the most [illegible] of this kind.

There still remains in 1940, one [illegible], a [illegible] called de la Tremoille; it was a regular fief granted as Paris under Charles V and held directly from the King, later from the Orléans. It was rebuilt about 1490 just as we have seen it, by Louis de la Tremoille, born in 1460. This Louis de la Tremoille espoused the duke of Orleans at the battle of S. Aubin-du-Cormier in 1488; which did not prevent the Valois after the succeeding King of France from confiscating such [illegible] of the army of the Valoens in 1500. He was killed at the battle of Pavia. Here (86) is the plan of the ground story of this mansion.

The entrance door A was accompanied by its porter a, and [illegible] spacious court, having near the entrance a porcion with a [illegible] building. Behind a small tower supported by two columns as the left at f, was a passage connecting the court with a garden that extended to the fruitgarden, and which at that [illegible] had a corresponding door with curiliage as right and left f [illegible] passage and garden, a great flight of steps [illegible] rance into the great hall D, the principal entrance E, the hall F by the door G, and the little vaulted room H, by descending [illegible]. Opposite is the door [illegible] hall [illegible] which reaches also I, the flight of [illegible] allowed one to penetrate directly from the court into the two rooms M and L. A second service stairs N accessed to the upper stories and even served the roofs. At O was a little court with well. The kitchens and their dependences were found in P: they were in great part destroyed and replaced in adjoining property. A porcion P joined to that of the entrance from the Tiraccappe allowed one to pass under cover from that kitchen and offices into the principal building by crossing the lower landing of the service stairs, thus arriving in the dining hall n. The porte 'a loge was arranged at V at the side near the Tiraccappe. At Y was discovered a well built a water, that formerly conducted the rain and waste water under street. In the second story the arrangement of the main

We have now come to the end of the 15 th century, and to d describe one of the most charming mansions of that time, so rich in structures of this kind.

There still existed in 1840, Rue des Bourdonnais, a mansion called de la Tremoille; it was a regular fief created at Paris under Charles V and held directly from the king, later from the bishop. It was rebuilt about 1490 just as we have seen it, by Louis de la Tremoille, born in 1460. This Louis de la Tremoille captured the duke of Orleans at the battle of S. Aubin-du-Cormier in 1488; which did not prevent the Valois after b becoming king of France from conferring upon him the command of the army of the Milanese in 1500. He was killed at the battle of Pavia. Here (36) is the plan of the ground story of t that mansion.

The entrance gate A was accompanied by its postern a, and opened on Rue de Bourdonnais; it gave entrance into a quite spacious court, having near the entrance a portico with a return at the right side. At the back rose the principal b building. Beneath a small tower supported by two columns at the left at B, was a passage connecting the court with a g garden that extended to Rue Tirechappe, and which at that side had a carriage gate with buildings at right and left f for carriages and horses. A great flight of steps C gave entrance into the great hall D, the principal stairs E, the hall F by the door G, and the little vaulted room H, by descending some steps. Continuing to descend, one reached the cellars, well ventilated and spacious. Another door I with flight of steps allowed one to penetrate directly from the court into the two rooms M and L. A second service stairs N ascended to the upper stories and even served the roofs. At O was a little court with well. The kitmhens and thei dependances were found in P; they were in great part destroyed and included in an adjoining property. A portico R joined to that of the entrance from Rue Tirechappe allowed one to pass under cover from that kitchen and offices into the principal building by crossing the lower landing of the service stairs, thus arriving in the dining hall D. The porter's lodge was arranged at V at the side next Rue Tirechappe. At Y was discovered a well built s sewer, that formerly conducted the rain and waste water under that street. In the second storw the arrangement of the main

the arch of the passage R, and the latter have admission to the oratory or cabinet placed in the angle tower. The portico O formed in the second story only a single open gallery from the chamber S to the court T. This gallery was adornedly lighted from the court, but on the street was only pierced by three small windows. The great building alone between the court and garden had a second story, served by the two stairs T and X. The buildings of the kitchens, offices and portico Z had only a ground story. At Y we give a block plan of the mansion de la Tremoille with the entire garden and buildings of the offices.

The architecture of that mansion was one of the most praiseworthy creations of the end of the 15 th century. The left tower, the grand staircase, the portico with their second story, and surfaced but little embellished. As for the facade of the building in the court, it had been much injured, by all the alterations of its ornamentation remained in parts because the modern alterations. That has defaced the Tuileries has very nearly, that one cannot admire too much in this charming architecture was the utmost taste displayed by the artists. The commissioners of the Tuileries had the Gothic parts was more empty. All that was torn down in 1840. Together with the commissions of architecture, it that made the work appear exhaustion be preserve this masterpiece. Yet we could not obtain more than the erection of some fragments in the Musée des Arts, where they can still be seen built into the left wall on entering.

In 1841 the Ministry of the Royal Buildings demolished between the tower and the gallery.[1]

[1] Ch. Lenormant. Les Tuileries. Fragments de Jacques Coeur. Paris 1855.

see Atkn. c/o. et dom. on 36. Verdier & Cattois. Vol.II.

Everyone knows the mansion of Cluny. That now contains a museum of antiquity from the middle ages, and which is built on the ruins of Julian; that edifice is in fact one more like a castle or in the feudal and primitive architecture. Built in the 15th century from a rectangular enclosure with the building being situated between a court and garden. In front from the Sorbonne has a gallery of the Gallery of that mansion.

[1] Ch. Lenormant. Les Tuileries. Fragments de Jacques Coeur. Paris 1855.

building was the same as that of the ground story; the division wall b was omitted, the two rooms L and M profiting by t the width of the passage B, and the latter gave admission to the oratory or cabinet placed in the angle tower. The portico Q formed in the second story only a single bent gallery from the point S to the point T. That gallery was abundantly lighted from the court, but on the street was only pierced by three small windows. The great building alone between the court and garden had a second story, served by the two stairs E and N. The building of the kitchens, offices and portico R had only a ground story. At X we give a block plan of the mansion de la Tremoille with the entire garden and buildings of the offices.

The architecture of that mansion was one of the most graceful creations of the end of the 15 th century. The left tower, the grand stairway, the porticos with their second story, had suffered but little mutilation. As for the facade of the building on the court, it had been much injured, but all the elements of its ornamentation remained in parts beneath the modern stucco. Next the garden the facade was very simple. What one cannot admire too much in this charming architecture was the delicate taste displayed by the architect. The assemblage of the plain and the decorated parts was most happy. All that was torn down in 1840. Together with the commission of historic monuments, we then made the most urgent endeavors to preserve this masterpiece. Yet we could not obtain more thau the transfer of some fragments to the Ecole des Beaux Arts, where they can still be seen built into the left wall on entering.

We give (37) the facade of the main building comprised between the tower and the stairway.[1]

Note 1.p.284. For the details of this tower and stairway, see Arch. civ. et dom. od MM. Verdier & Cattois. Vol.II,p.

Everyone knows the mansion of Cluny, that now contains a m museum of objects from the middle ages, and which is built on the baths of Julian; that edifice is is of the same time as t the mansion de la Teemoille and presents an analagous arrangement. On Rue des Mathurins rises a crenelated enclosing wall, the building being situated between a court and garden. We borrow from Baron de Guilhermy this summary of the history of that mansion.[2]

Note 2.p.284. See Itiner. archaeol. de Paris. Paris 1855.

note 1.p.286. M. Du Sommerard, son of the founder of the c collection, since 1842 has been conservator of this museum, w which by his intelligent direction, increases daily and is o one of the richest in Europe.

We give (28) the plan of the ground story of this museum. The building for restoration is larger than that of the museum de la Tremoille, but the garden was less extensive. At A is the principal datum the Ves Wednesday-S.-Jacques with its rosaces A'. The porter's lodge is at P; then rises a portico C, that gives entrance to the court H of the ground story, room also entered from the grand entrance T by a little door F. The kitchen is at D with its flight of steps and its corridors P, having also an exit outside on the floor of the kitchen and in the room E'. A door G affords a direct entrance from the court into that kitchen. At I is a room behind on the corners with circle angles J, having a door into the garden, o the last room I has be the centre, L, so I is in the same as L, a case if ever, with large the large as the [illegible]

"In the first half of the 14 th century about 1340, Pierre de Chasles, abbot of Cluny, purchased the site of the palace of the baths with the intention of erecting there a lodging near the college, that his abbey possessed opposite the Sorbonne. This project does not seem to have been followed by execution; for it was only at the end of the 1i th century that Jean de Bourbon, one of the successors of Pierre de Chasles, undertook the construction of the edifice, which still r remains. When that prelate died in 1345, the foundations scarcely rose above the ground. Jacques d'Amboise, who united the titles of bishop of Clermont, abbot of Cluny, abbot of Jumieges and abbot of S. Alyre, resumed in 1490 the work of his predecessor, and carried it out to entire perfection."

More fortunate than the mansion de la Tremoille, the mansion of Cluny was preserved, due to the collection that Du Sommerard knew how to gather there, and to the European reputation soon acquired by that museum of objects of the middle ages. In 1842 the State purchased that museum and the collection t that it contained, caused to be ceded by the city of Paris the remains of the baths of Julian, and today that entirety has become the meeting place of all that take some interest in m matters of the past. [1]

Note 1.p.286. M. Du Sommerard, son of the founder of the c collection, since 1843 has been conservator of this museum, w which by his intelligent direction, increases daily and is o one of the richest in Europe.

We give (38) the plan of the ground story of this mansion. The building for habitation is larger than that of the mansion de la Tremoille, but the garden was less extensive. At A is the principal gateon Rue des Mathurins-S.-Jacques with its postern A'. The porter's lodge is at B; then rises a portico C, that gives entrance to the rooms H of the ground story, rooms also entered from the grand stairway F by a little door f. The kitchen is at D with its flight of steps and its private stairs P, having also an exit outside on the floor of the kitchen and in the room H'. A door g affords a direct entrance from the court into that kitchen. At I is a room behind on the garden with angle stairs R, having a door into the garden, o one to that room I and to the corridor L. At K is an open hall, a sort of covered yard under the chapel in the second story.

F is a court with entrance O in one of the antique halls of the baths. M is also an antique hall in which were probably placed the stables. The corridor L formerly communicated with the privies. The wall on the street is crenelated and was furnished with a wooden defensive gallery borne on corbels now destroyed, and replaced by wrought iron angles. A little stairs S permits one to descend from the room I into the covered yard K and to ascend directly to the chapel. The garden G is 55.8 ft. wide by about 115.0 ft. long, and was bordered by private properties. The principal stairway F is terminated by a platform reached by a little screw stairs starting from the attic story. The mansion of Cluny, like that of de la Tremoille, p possesses cellars, ground storw and second story, and an attic mansard story. The structures are very well preserved. The old floors, composed of girders receiving the beams, are still vi visible, and several fireplaces date from the primitive construction. Although the architecture of the main building has not the elegant delicacy of the mansion de la Tremoille, yet it lacks neither grace nor style. The wendows are happily placed, the stairs are very skilfully arranged and the chapel is a little masterpiece. It has a little apse borne by corbelling on the external pier of the covered yard. Like that yard it is vaulted, and its four cross vaults rest on a central column.[1] Fig. 39 gives a cavalier view of that mansion, taken from the entrance side.

Note 1.p.287. For the details of this manston, see Statistique monumentale de Paris, published by M. A. Lenoir, under the direction of the ministry of public instruction.

There still exists at Paris a mansion of the end of the 15 th century; this is the mansion of Sens, which served as a r residence of the archbishops of Sens, when they sojourned at Paris.[2] This mansion is situated at the crossing formed by t the meeting of Rues de l'hotel de ville, du Figuer, dell'Etoile, des Barres and du Fauconnier. It was erected by archbishop Tristan de Salazar from 1475 to 1519. The numerous mutilations suffered by it have taken away its character almost entirely.

Note 2.p.287. The bishopric of Paris until in the 17 th century was suffragan of the archbishopric of Sens.

One still sees pretty mansions of the Renaissance and of the

beginning of the 17 th century in some provincial cities. Mansion de Prince at Angers is a charming edifice of the 16 th century; that of Vauxluisant at Troyes, which dates from the first years of the 17 th century, is remarkable for its plan and the happy outlines of its buildings. At Toulouse remain still a great number of mansions of the 16 th century. The w work of Du Gerceau (Les maisons des villes) presents numerous examples of good plans and of buildings in excellent taste.

If the houses during the 17 th century were scarcely more t than vulgar lodgings, in which it is difficult to find a trace of art, it was not the same for mansions. Under the reigns of Henry IV, Louis XIII, Louis XIV and Louis XV, Paris, Lyons, Toulouse, Bordeaux, Caen, Nantes, saw arise a number of beautiful mansions, that still retain the arrangement of the habitations of the nobles and of the rich citizens of the middle ages and the Renaissance. Mansions Lambert, Carnavalet, Mazarin (Imperial Library), Pimodan, Soubise (Archives of the Empire), are still models of grandeur and of good taste, that depreciates all that has been done in that kind in our days. Because it is easier to acquire wealth than the feeling of grandeur of taste.

MAISONS DES CHAMPS. Country Residences.

As we stated in commencing this Article, the country house should not be confused with the manor house. The manor house is the habitation of a gentlemen, a chevalier, who does not possess the feudal rights of high and low justice, but who is a landed proprietor, and who has no other service to pay the sovereign than personal military service. (Art. Manoir). The country house is the habitation of the farmer, colonist, renter, tenant and the peasant. The country inhabitants renew their dwellings less frequently than those of the cities, first because they are poorer, then because their needs vary little. A citizen in our days has retained none of the habits of his ancestors, while a peasant in the middle of the 19 th century lives nearly as one of the 14 th. Thus the more one descends the scale, the less differences are found between the country dwellings of the middle ages and those of our times. In passing over the country in our French provinces, which have been especially removed from contact with the inhabitants of the great cities, like certain parts of Languedoc, Correze, Auver-

Auvergne, Berry, Saintonge, Brittany, Upper Marne, Morvan, J Jura and Vosges, one yet discovers secular habitations, that have been but slightly modified, and that furnish us very p probaoly by transmission examples of the dwellings of Gallo-Roman country inhabitants.

Indeed in these habitations one recognizes the use of certain procedures in construction, that retain all the characters of a naive art, and if the material be crude and the workmanship be coarse, the application of the principle is correct and sometimes impressed with that charm attached to the primitive arts, for whoever knows how to see it. There still exist in the middle of the forest of Morvan certain peasants' houses in which a countryman of the Edui would find no change, if he returned after 18 centuries; and we have even seen on the banks of the Loire and Seine and in the Vosges, peasants' living in caves excavated by human hands, which are preserved just as the Roman armies could have seen them. The variety of these country dwellings on the soil of France is one of the proofs of preservation of ancient traditions; for if all our city h houses resemble each other today, it is not less so in the country, and the thatched cottage in Picardy does not at all resemble that in Brittany; the latter essentially differs from the cabin in Morvan, that recalls in nothing that of Franche-Comte, Auvergne or of lower Languedoc.

We happened to stop in certain villages in France where each house was built for a single owner, and retained a character of primitive roughness, very far removed from our modern civilization, where all tends to lose its special appearance. We think that we shall be expected to give here the houses of t the peasants classed by certain epochs, as we have been able to do for minor habitations. The transmission of some types accepted for centuries also forbeds that classification. Since we have brought ourselves to believe, that certain provinces have not ceased to erect the same rural dwellings since the epoch of the invasion of the barbarians, it is evident t that we could with difficulty distinguish a house of the 10 t th from another of the 14 th centuries. We shall then content ourselves with furnishing some of those well characterized ty types, without assigning them any precise epoch and the less, because these structures were generally built with the aid of

very small resources, and have not been able to resist the e effect of time, have retained ttha primitive character only by the repetaition of the same procedures, the use of the same materials and conformity to the same habits. However the oldest rural houses, or at least those that appear to have suffered the least alteration, belong to the provinces of the Centre and the East. In Morvan, the lod peasant's house only presents externallw a mass of piled stones. Walls built of great blocks of granite and pierced by little openings, a very low ground story serving as cellar, storeroom, poultry or swine house. Door raised 3.3 ts 6.6 ft. from the ground with a flight of steps and a landing engaged in the wall; ceiling formed of great beams with joists. Garret above protected by heavy carpentry covered by stone plates called "laves" in the country (40). Each house contains only one room with its fireplace; if one wants two rooms, there are two houses joined at t the gables. No decoration in that house, nothing to present a taste for even the rudest art. The timbers are scarcely squared, the floor is covered by tamped earth covered by a layer composed of granitic sand and clay.[1] If one approaches Nivernais and upper Burgundy, on the contrary one frequently finds in the houses of peasants traces of art; the lintels of the doors are cut with care, the jambs are well dressed, the interiors are plastered and are sometimes wainscoted to the height of the window sill. The timbers are squared and even chamfered; tiles from ancient times replace the heavy stone r roofing. Sometimes the external stairs are tastefully arranged, the landing having fine stone railings; the joists of the ceilings project on the exterior, forming a cornice and join the rafters (41).[1] These country habitations in Burgundy are often faced with care and assume certain architectural forms.

Note 1.p.290. In these houses of such a poor appearance, it is not rare to find peasant families comparatively rich and possessing very considerable property. Among these peoples, nothing is sacrificed for comfort. Their only preoccupation is to possess land and to amass crowns to increase their little domains.

Note 1.p.291. Between Dijon and S. Seine.

The houses of peasants still well preserved in the village of Rougemont between Montbar and Aisy furnish the proof. These

houses mostly date from the beginning of the 13 th century, and present their gables to the street, are built with remarkable care (42), and nearly all possess a story over the ground story; but it must be stated, that this village depended on a rich abbey. Indeed in the vicinity of the religious establishments the houses of the country men were best built until the 14 th century, and those houses are habitually constructed of masonry. Suenon [2] says that the land destined for the habitations of the peasants around the agricultsral establishments of the religious was divided in equal parts. "We believe," says M. L. Delisle,[3] "that this rule was frequently followed in our province (Normandy), where for a long time the word "boels" has had the sense of court or hut. To the colonists were then assigned the lots, usually longer than wide, from which was the common name of 'long boels'. At one end of the lot each one built his hut. All the doors opened at the same side on the road, that became the street of the village." That arrangement is observed at Rougemont and in many other farming centres belonging to the abbeys during the 12 th and 13 th centuries.

Note 2.p.291. Leges Scanicae. Book IV. Cited by Ducange under Boel.

Note 3.p.291. Etudes sur la condition de la classe agric. en Normandie au moyen age. p.386. Evreux. 1851.

In the North, in Normandy and Picardy, the country habitations, the lot was an enclosure with a house generally built of wood. On the banks of the lower Seine, Orne, Dives, on the shore of the Channel from Eu to Cherbourg, the Normans left still visible traces of their special genius. The houses of the peasants are half timber frames filled with earth mixed with straw, covered by thatch or wooden tiles. If after some years the old habitations of those provinces tended to disappear to be replaced by small houses of brick covered by slates, a great number were still to be seen in 1830, that recalled by their construction the carpentry of Norway, Denmark, a and those indicated in the tapestry of Bayeux. The Normans, like all peoples of Scandinavia, built only in wood, and were good carpenters from the epoch when they came to establish t themselves on the coasts of France. Navigators, their habitations retained something of naval construction. The manuscripts

regarded as Saxon in England, and preserved in very great number in the British Museum, present in their vignettes specimen habitations, that also recall naval structures.

In Norway and Iceland still exist some of those carpentry structures of a quite recent epoch (16 th century), but which reproduce accurately the form and procedures of a much older art. In those habitations, as on the embroideries of the tapestry of Bayeux, for example, one notes the kingposts richly ornamented, tha terminate the two ends of the ridge, and that are connected above the roof by a timber cut out like a c cresting. One still saw in the country of the Eure not long since slight remains of that tradition clearly expressed in our Fig. 43. Those Norman houses of the 11 th and 12 th centuries contained only a rather high hall lighted on all sides, covered by carpentry rudely ceiled. The hearth was placed near the middle of the room, and the smoke escaped through a w wooden duct passing through the roofing of thick wooden tiles.

In the provinces of the Centre, like Auvergne, Velay and t the southern part of ancient Aquitaine, it seems that Celtic traditions were retained very far into the middle ages. The houses of the inhabitants of the country were in part excavated in the ground and covered by a sort of pile composed of earth and piled stones on timbers placed radially around a principal beam. An opening made at one side of this pile served as door and window, and the smoke of the hearth escaped by an opening at the middle of the pile. We have seen in the mountains of Cantal habitations of this sort, that appeared ancient, and that were a tradition from a very ancient epoch. It is unnecessary to state that art nowise entered into this sort of habitations. Certain huts in Bocage and in Brittany indeed have some relations with these, in that the internal ground is lower than the external soil, and that the roofs covered by thatch descend nearly to the ground. But these habitations do not assume the conical form externally, they are covered by gable roofs with two gable walls of dry stones or of half timber frames filled with mud.

Approaching the banks of the Rhine, in the provinces of the East, in the mountains of the Vosges, near the little lakes of Guardmer and Retournemer, one sees still the habitations of peasants, that present all the characters of wooden log

construction. Low and wide, well built to resist hurricanes and to support snow, they have a strange appearance. Those h houses are nearly always composed of three rooms in the ground story and four rooms in the attic (43 bis). The plan A of one of those houses is taken at the level of the ground story, and presents at B the entrance hall, from which one passes e either into the great hall C or into the rear room D, which has the only stairs ascending to the second story under the roof. In the hall C, lighted at the two ends, assembles the entire household for meals and in the evening. Also in that room is prepared the food. A great chimney with jambs, back, mantle and flue of masonry passes through the roof. That is the only part of the building together with the base, that is not of wood. The covering is made of tiles, schist or thin slabs of sandstone; it is further loaded by stones. The houses stand on a substructure about 3.3 ft. high made of great blocks of sandstone. A partition composed of trunks of trees rudely squared divides the house at the middle lengthwise and supports the upper ends of the rafters. This and the two side walls join the two gable walls, are corbelled out and thus f form the great projections of the roof. A floor of joists rests on these three parallel wooden walls. Those buildings receive light only through the wooden gable walls. It is difficult to not see in these houses a very ancient tradition, that approaches the wooden structures of old Switzerland, so interesting to study.

On the banks of the Garonne, in Languedoc and Provence are found the most graceful rural habitations, those best recalling the country houses of antique paintings. Roman tradition has remained purer in those provinces than elsewhere in France. Those peasants' houses are large and spacious, low, always orientated in the most favorable manner, possess porticos or rather open sheds, low so as to shelter the inhabitants in t that mild climate, who devote themselves to their labors outside the house.

In the plains of Toulouse, in Ariege and Aude, the coast of Limoux, in the midst of groups of century trees are seen houses built in this way, and that are relatively early, i.e., da date from the 15 th century. Besides, those still erected today of unburn bricks and pebbles follow exactly the same programme.

In fact those peoples have always been agricultural and attached to the soil, and have but slightly modified their habits since the 14 th century. Here (44) is one of those rural habitations.

The system of tenure at half rental of fief farms was customary in the provinces of Languedoc as it is today. The peasants holding those farms as renters ran less risk than those who leased for a term, or who obtained a concession of lands for a fixed rental; they lived in a more complete state of s security. This explains the character and comfort observed in the rural habitations of that country, and also their uniformity for several centuries past.

In the North and especially in Normandy, the system of rental for half, or of a perpetual concession for a fixed rent, was generally replaced after the 13 th century by the lease for a term. The lord retained the property in his lands, and he ceded the use of it to a farmer for a limited time and on fixed conditions. "Several causes," says M. Delisle, "favored the development of that tenure, and they preferred it to a perpetual concession. In the first centuries of feudalism were scarcely known the latter; but men finally perceived that the rent fixed by a lease in time lost the greater part of its va value. This consequence was inevitable, not only from the change in value of money, but also from the change operating in the relation of money to articles purchased. On the other hand, the weakening of the feudal system tended to deprive the lords of the principal means previously employed for utilizing their domains not granted. Thus one conceives how they were brought to treat with the farmers. They relieved themselves of the co cost of cultivation, and were no longer exposed to see their fortunes reduced to rents, whose nominal value was unchanged, but whose real value became more and more insignificant." Even sometimes the lord needed ready money, and received from t the farmer in passing the lease the total amount of the rental for several years. It is evident that these actual loans were made on hard conditions for the owner and tended to enrich t the farmer. Thus in Normandy rural habitations are seen to t take a considerable relative importance and to be modified more rapidly than in any other province.

Note 1.p.297. Etudes sur la condition de la classe agricole en Normandie au moyen age. p.51. Boreux. 1851.

[illegible] Gallo-Roman [illegible] Plain Sain-
nay Aulnaysaye, 1347/Aurelia [illegible] 1347/47 a [illegible] of [illegible]
ness, and were joined to a quite remote group; but these twi-
lights were occupied by circles rather than farmers. There ex-
ist several of those between Poitou and Gaunes.

Here (45) is one of them still entire, built at the entrance
of the village of Ganet near Gannes, half way up the hill a
and about 2.5 miles from the sea. It consists of a square tow-
er having two storeys above the ground above with no communi-
cation with the exterior. The doorway is elevated 9.3 ft. ab-
ove the external soil and was accessible only by means of a
ladder, which could be taken up easily to avoid trouble.
[illegible] or carry the [illegible] (for the only
[illegible] with the [illegible] was by a [illegible]
in the floor of the second) is pierced by six machicolations
in the form of holes and has no windows. The second has no or
ener opening than the door. From this story one ascended to
[illegible] by a [illegible] ladder.[1] The [illegible]
[illegible] last [illegible] the roof indicating a
[illegible] which is [illegible] by the same
[illegible] of the Romans. The last story is vaulted in [illegible]
vaulted [illegible] cost. [illegible] Gaulish [illegible] a certain number
of [illegible] of this kind.

Note 1.p.295. We owe these drawings to the courtesy of M. [illegible].

These country habitations, arranged in a manner to serve as
a refuge for some men living isolated and precisely evilly wi-
th their neighbors, are also found on the western coasts. One
of those best preserved and most important exists near Certe-
aux (46); it was formerly surrounded by a ditch filled with
water. A flight of 12 steps sunken in the wall led from the
level of the water to the raised doorway. Perhaps a plank was
thrown across the ditch when one desired to enter. That door
gave admission to a single room of the second story, furnished
with a fireplace and pierced by a small window and six slots.

This communicated with the cellar by a trap opened at the
center of the room. By taking the room square was reached t
he third story with a fireplace-like the second; slots and a
[illegible] were [illegible] square.[1]

Note 1.p.296. These drawings were furnished by M. Duvoux [illegible] et Bordeaux.

On the shores of the Mediterranean one sometimes finds country habitations, that assmue the form of a tower or little k keep, and that belong to a quite remote epoch; but these dwellings were occupied by pirates rather than farmers. There exist several of those between Toulon and Cannes.

Here (45) is one of them still entire, built at the entrance of the village of Cannet near Cannes, half way up the hill a and about 2.5 miles from the sea. It consists of a square tower having two stories above the ground story with no communication wit the exterior. The doorway is elevated 9.8 ft. above the external soil and was accessible only by means of a ladder, that could be drawn up easily to avoid troublesome p persons. The second or rather the third story (for the only communication with the ground story was by a trapdoor placed in the floor of the second) is pierced by six machicolations in the form of hoods and has no windows. The second has no ot other opening than the door. From that story one ascended to that with the machicolations by a miller's ladder.[1] The rope ornament that decorates the lintel of the door indicates a v very early epoch. At Cannet this tower is known by the name of the house of the brigand. The last story is vaulted in rubble under the roof. Also in Corsica are seen a certain number of habitations of this kind.

Note 1.p.298. We owe these drawings to the courtesy of M. Merimee.

These country habitations, arranged in a manner to serve as a refuge for some men living isolated and probably evilly with their neighbors, ara also found on the western coasts. One of those best preserved and most important exists near Bordeaux (46); it was formerly surrounded by a ditch filled with water. A flight of 12 steps engaged in the wall led from the level of the water to the raised doorway. Perhaps a plank was thrown across the ditch when one desired to enter. That door gave admission to a single room of the second story, furnished with a fireplace and pierced by a small window and six slots.

This communicated with the cellar by a trap opened at the centre of the room. By taking the screw stairs was reached t the third story with a fireplace like the second; slots and a bay were placed over the entrance doorway.[1]

Note 1.p.300. These drawings were furnished by M. Durand, architect at Bordeaux.

There have been mentioned to us several of these brotherhoods in the county Palmas and Santa Ana Nayarit.

5. Jean de Luz. We incline to believe that these houses date from the epoch of the Indian domination in Oriente. Indeed, one sees in the country of Suffolk in England a small house (Tranam Hall) built in the same manner, and which dates from the end of the 13 th century. That structure is a parallelogram with square entire in a right angle tower. The entrance being elevated, it is reached by steps entered in the wall.

These should not be confined were the houses built in centuries, the houses of the order, that were free of outside communication, and served as asylums for pilgrims and the sick, and which were placed under the supervision of the religious. These houses were characterized by a single large floor on the roof.

Note 3.p.300. Etudes sur la condition de la classe serfs.

The manor house is sometimes only a house of small extent, and is the habitation of the owner of a fief, noble or not, but not possessing feudal rights allowing him to wrest justice from the serfs. In the middle ages it gave shelter and and it can be enclosed by walls and strengthened by ditches, but it is not a castle. The manor is a country house, from the economical point of view, placed between the feudal castle and the house of a vassal, a class superior to that attached to the land (serfs). [illegible] "Serfs are [illegible] le [3] with regard to the position of this class in Normandy, "essentially differed from the nobles, who only held their fiefs by good faith, homage and military service." But in certain [illegible], they [illegible] military service, [illegible], [illegible] lands, aniels and sergts. The dwellings of the sergeants, and even of the clerks, i.e., of those holding from the land lords more or less extensive, who united several sub-vassals in their hands, and who remained responsible for the services and rendals of the sub-vassals of the degree, could not be regarded as manor houses, because they were not enclosed.

There have been mentioned to us several of these habitations on the coast between Bordeaux and Bayonne and even beyond to S. Jean de Luz. We incline to believe that those houses date from the epoch of the English domination in Guienne. Indeed, one sees in the county of Suffolk in England a small house (Wenham Hall) built in the same manner, and which dates from the end of the 13 th century. That structure is a parallelogram with screw stairs in a little angle tower. The entrance being elevated, it is reached by steps engaged in the wall.

There should not be omitted here the houses built in cemeteries, the houses of the cross, that were free of outside secular jurisdiction, and seryed as asylums for pilgrims and the sick, and which were placed under the supervision of the religious. These houses were recognized by a wooden cross fastened on the roof.

MANOIR. Manor House. Manor. [2]

Note 2.p.300. (Latin note).

The manor house, although this name sometimes designates a castle, is the habitation of the owner of a fief, noble or n not, but not possessing feudal rights allowing him to erect a castle with towers and keep. But the manor house is closed and it can be enclosed by walls and surrounded by ditches, but not defended by towers, high crenelated curtains and a formidable fort. The manor is a coun ry house, from the architectural point of view, placed between the feudal castle and the house of a vassal, a class superior to that attached to the feudal lands, a free man. "These sub-vassals," says M. Delisle [3] with regard to the position of this class in Normandy, "essentially differed from the nobles, who only held their fiefs by good faith, homage and military service." But in certain lordships, they owed military service, mounted, armed with lances, shields and swords. The dwellings of the sub-vassals, and even of the eldest, i.e., of those holding from the lord lands more or less extensive, who united several sub-vassals in their hands, and who remained responsible for the service and rentals of the sub-vassals of the group, could not be regarded as manor houses, because they were not enclosed.

Note 3.p.300. Etudes sur la condition de la classe agric.

The manor house is sometimes only a house of small extent,

surrounded by walls and with a garden; more frequently it is a collection of buildings devoted to agriculture, enclosed by ditches and wit: a principal building for the habitation of the proprietor. The villas of the kings of the first race of the kings were rather manor houses than castles, and until the 16 th century the great sovereign lords in France, besides t their castles, that were veritable strong places, were pleased to erect pleasure houses to give themselves to the pleasures of the chase, or to retire for a certain time; those houses may be regarded as manor houses. Many royal abbeys possessed within their enclosures manor houses, to which princes ca came to rest from affairs. (Art. Architecture Monastique). T The pleasure house of Bicetre near Paris, or rather of Winchester,[1], which was burned by the people in 1411, was a great ma manor house rather than a castle, although it had one tower.[2] Under the kings of the third race Fontainebleau and Blois were likewise great pleasure houses, that had the character of the manor house.

Note 1.p.301. Becouse in 1204 it had belonged to John, bishop of Winchester. (Sauval, Antiq. de la ville de Paris. II,72.

Note 2.p.301. The ruins of the manor house of Bicetre are seen in an engraving representing the ballet given by the count of Soissons at the Louvre in 1632. Count Horace de Vielcastel has furnished us with precious data on this subject.

England has preserved a very considerable number of these c country houses of the 13 th, 14 th and 15 th centuries; but in France we know none, that are entire and date beyond the 1 15 th century. The manor house, properly so-called, always c contains a hall like a castle, and in England the name of manor house has been retained. In fact in these residences the hall is the important part of the programme until the 15 th century.

In the 12 th century king Richard of England had at Southampton a manor house, that served as a gathering point at the t time of embarcation. That building consistsoof a hall, a chapel and a cellar.[3] A private chamber was often placed beside the hall.

Note 3.p.301. Dom. arch. of the 12 th century, by Hudson T Turner, Parker. Oxford. 1851.

The name of manor house is sometimes applied to the house

of a guest, or a colonist, when that house is surrounded by an enclosure. (Old French poem).[4]

Note 4.p.301. Romon du Renart. Verse 8093.

The arrangement of the manor houses at the end of the 12 th century and during a part of the 13 th, was the same in France and in England. The abbey of S. Maur possessed at Piple near Bossy-s-Leger a manor house on which depended 33 acres of vineyard wit two presses and 10.5 acres of forest. Abbot Pierre I about the middle of the 13 th centurw caused the manor house to be rebuilt in part; there by his order was built the chapel, a hall with cellar beneath, and a lodging surrounded by walls and wide ditches.[1] Yet from the 13 th century the distinction between the castle and the manor house was less sharp in England than on this side of the Channel. Many of the English c castles of that epoch would be for us great manor houses because they do not have the defenses, that constitute a castle with us. The castles of Aydon (Northumberland) and of Stokesay (Shropshire) [2] would in France be classed among manor houses, and that of Aydon in particular is one of the most complete and largest that can be seen. It comprises a principal building of three stories with wings, courts anf a garden enclosed by good walls. This manor house is crenelated, but possesses neither tower nor keep. The strongest castles in England wit rare exceptions retain the appearance of a country house, which distinguishes them from our great feudal residences, such as Coucy, for example, which explains the internal state of the country after the 13 th century.

Note 1.p.302. Hist. du dioc. de Paris. Lebeuf. XIV.p.324.

Note 2.p.302. Dom. arch. of 13 th century. Chap. IV.

Several castles of Guienne, built under the domination of the English, although retaining in their details all the characteristics of the French architecture of the end of the 13 th and beginning of the 14 th centuries, present that peculiarity of recalling the arrangements of the great Anglo-Norman manor houses. To become assured of this, it suffices to look over t the excellent work on those edifices published by M. Leo Druyn.[3] Square building with enclosures, absence of flanking towers, buildings pierced externally, lower courts enclosed by walls, outer ditches. Irregular plans like those of the Roman villa, services separate from each other and forming many str-

structures. The English have retained in the arrangement of t the country houses, that they build today, those traditions of the middle ages, do not find them bad, and apply without d difficulty those true principles of modern life. We freely r recognize that the English are our masters in the matter of comfort (they invented the word), and we repeat in all tones, that the architecture of the middle ages cannot lend itself to our modern habits. There is one of those numerous contradictions in judgment, that we make in France in art matters.

Note 3.p.302. La Guienne militaire, etc. by Leo Drugn.

Already in the castles of the middle ages is recognized that the different services occupy the proper places, assuming their relative importance without the architects being otherwise occupied with questions of symmetry. But in the castle military reasons often impose arrangements, that must oppose or m modify certain habits of well-being (Art. Chateau); it is not so with the manor houses. There it is only necessary to satisfy the needs and tastes of the owner; the question of defense is accessory; the manor house is only a country house sufficiently enclosed to be protected from a sudden attack by some adventurers, and it does not pretend to resist a regular siege. Simple during the 12 th and 13 th centuries, like the habits of the landed proprietors of that time, the manor house then possesses only a hall with a cellar beneath and a small added apartment; about it are grouped some rural buildings, barns, stables, wine press, bakehouse, lodgings for guests or colonists, the whole enclosed by a wall or a deep ditch.

In the 14 th century the manor house extends and attempts to resemble a castle, has several stories, and the services become complicated. At the end of the 15 th century the manor house often assumes the importance of the castle, excepting t the defenses consisting of numerous towers, advanced works a and high curtains. Plessis-les-Tours, inhabited by Louis XI, was only a great manor house, and its real defense consisted of a thorough watch over the exterior, that kept away indiscreet and suspected persons. When artillery became a means of attack against which mediaeval fortifications were found powerless, manor houses arose in great numbers because men found daily the uselessness of costly defenses built in the preceding centuries. In the 16 th century many little castles demolished

ment leaves towns, placed the castles accordingly, and
[illegible] into [illegible]. Thus militarization
crowded into Prague by the nobles, by the centralization of
power, by the marching of legislation, into country residences,
modifications that belong to regions the castles by the manor
house, had no reason to produce itself in England. In that c
country the castle is only a strong place; the country resid-
ence, from a very early period, assumes the characteres of the
manor house, and still retains it today.

There no longer exist in France these manor houses of 1
12 to and 14 in centuries, when as are still seen in England;
the ages of the 15 on and 16 in centuries overthrew a great
number of them,for those residences could not defend themselv-
es against armed bodies. In the last century the laws of nov-
elty caused the destruction of a vast quantity of those cand-
ly dwellings. Some of the most consequential were alone preser-
ve, or monumental by [illegible] [illegible]
ia for open manor houses, and must would be country houses for
[illegible] it is hardly in [illegible] [illegible]
Ile-de-France, Bourbonais, Orléanais and Beauvoisis, that one
finds some traces, even in cellars, subterranees and [illegible].

We shall describe several manor houses still exist, and will
[illegible] [illegible]
[illegible] Castlemaine caused the building of two palaces "of
[illegible]
[illegible]
Vanel. After the example of the emperor and under the Carlov-
ingians, the conditions consequeted by the great proprietors
adapted to the Roman villa. Thus as the feudal system was cons-
[illegible]
[illegible]
ate the construction of the possession of the landed propri-
[illegible]
metics. We see that the parlement [illegible] to preserve the
[illegible]
the feudal organization several motives arrested the too gre-
at development of fortified habitations, even joining the g
[illegible]
[illegible]

their useless towers, pierced the curtains externally, and were thus converted into manor houses. Those modifications brought into France by the customs, by the centralization of power, by the weakening of feudalism, into country residences, modifications that tended to replace the castles by the manor house, had no reason to produce itself in England. In that c country the castle is only a strong place; the country habitation, from a very early epoch, assumes the appearance of the manor house, and still retains it today.

There no longer exist in France those manor houses of the 13 th and 14 th centuries, such as are still seen in England; the wars of the 15 th and 16 th centuries overthrew a great number of them,for those residences could not defend themselves against armed bodies. In the last century the love of novelty caused the destruction of a vast quantity of those country dwellings. Some of the most substantial were alone preserved, by approaching the defensive arrangements of the castles. As for open manor houses, and what would be country houses for us, it is hardly in some farm houses of Champagne, Burgundy, Ile-de-France, Laonnais, Soissonais and Beauvoisois, that one finds some traces, such as cellars, substructures and enclosures.

We shall describe several manor houses still erect, and will enter into some details relating to the constructors of those dwellings. Charlemagne caused the building of two palaces "of remarkable work," says Eginhard,[1] the first not far from Mentz and near the land of Ingelheim;[1] the other at Nimeguen on the Vahal.[2] After the example of the emperor and under the Carlovingians, the habitations constructed by the great proprietors adhered to the Roman villa. But as the feudal system was constituted, the country habitation was coverted into the strong place, and it was hardly in the 13 th century under the reign od Louis IX, that the royal power was strong enough to regulate the construction of the habitations of the landed proprietors. On that subject the Olim furnishes us with much information. We see that the Parlement intervened to prevent the knights and squires from fortifying their residences.[3] Within the feudal organization several motives arrested the too great development of fortified habitations, even obliging the g great barons in certain cases to content themselves with manor houses. "Powerful lords often for certain fiefs held from

Note 1.p.204. At 10 miles southwest of Mentz.

Note 2.p.204. The manor house of Ingelheim and that of Wineburn were rebuilt in the form of castles by Frederic I. Barbarossa. Rhaelius gives the description of the palace of Ingelheim. Books IV and V. It resembled a Roman villa in general arrangements.

Note 3.p.204. Here is an example:- "Ritterburg de Bestec, ganze, built a fortified house, or it is said on Mt. Abois. The abbot of Cluny opposed it, claiming that this sculpture could n not build in that place on account of certain agreements made [illegible] why the abbot demanded the destruction of what he had built in that place, and that the sculpture should be enjoined to not [illegible] that the abbot should not be heard on that subject, and that his hostilities should not be destroyed; he added that he had not erected a fortress, that he did not hold from the abbot, that from time immemorial he and his predecessors had possession of that mountain as of his "alleu", together with the warren and other dependances. In brief, having heard the reasons of the two parties, and having learned from the bailiff of M [illegible] and that several nobles and other persons protested and opposed on their part, what had been built in that place, because

lords, that in the hierarchical order of scoiety were much i inferior to them; thus the duke of Burgundy was a vassal of the bishop of Langres in regard to the fief of Chatillon. Th Those great vassals could then take their cases to the tribunals of those lords, when lawsuits arose, either on account of the fiefs held from them, or in regard to any misdemeanor committed on the territory of those fiefs. That jurisprudence w was too simple, toomuch conformed to the custom of the fiefs, never to have been contested. But the complainants, when they had as opponent one of the great barons of the realm, and for judge a lord unable to cause his decrees to be executed, and consequently to decide with independence, addressed themselves to the king's court, and demanded that the criminal be held to reply before it,[1] as a direct vassal of the crown."

Note 1.p.303. Vita Karoli imperator. Chapter 17.

Note 1.p.304. At 10 miles southwest of Mentz.

Note 2.p.304. The manor house of Ingelheim and that of Nimeguen were rebuilt in the form of castles by Frederic I. Ermoldus Nigellus gives the description of the palace of Ingelheim. Books IV and V. It resembled a Roman villa in general arrangements.

Note 3.p.304. Here is an example:- "Etienne de Beziac, squire, built a fortified house, as it is said on Mt. Avoie. The abbot of Cluny opposed it, claiming that this squire could n not build in that place on account of certain agreements made formerly between their predecessors, and also because it was detrimental to his church and the entire country; that was w why the abbot demanded the destruction of what he had built in that place, and that the squire should be enjoined to not build there henceforth. On the other hand, Etienne replied that the abbot should not be heard on that subject, and that his habitation should not be destroyed; he added that he had not erected a fortress, that he did not hold from the abbot, that from time immemmorial he and his predecessors had possession of that mountain as of his "aleu", together with the warren and other dependances. In brief, having heard the reasons of the two parties, and having learned from the bailiff of M Macon, that this mountain was already very strong in itself, and that several nobles and other persons protested and opposed on their part, what had been built in that place, because

By that intervention of the King's parliament in such boundary disputes, an intervention caused by the royal bailiffs, a great lord possessing a fief held from a less powerful lord could do longer appeal on it one of those fortified habitations, which would have dominated the country; he was compelled to content himself with a simple manor house, to which it was well understood that he could give all the importance he chose. Also at that moment when feudalism was seriously threatened, there, in the years 1241-1242, that which was really an event occurred in France. Those petty seigneurs, attached and affiliated and grouped in vicinity with the royal authorities, i.e., fortified towers, donjons and keep, as fiefs possessed the feudal rights, rights of marching among others, for we see that a nearly always marches blocked to the minor houses; non the marches, as proved by M. Beaumontaire,[2] was the exclusive right to march over the lands of the vassals, and not the right of raising fences in certain places. But the decrees of parliament [3] had admitted in principle, that the right of establishing new cities, new marches and new high ponts belonged to the King alone. Thus on the one part, the King by his decree of the parliament decision, as much as possible, the building of fortified castles, and on the other refused admission to the feudal vassals to the lands, marches and bridges, when these fiefs had not been confirmed by previous possession. Certain the construction of a fief did not convey the prerogative of the mobility, and if commenced construed a fief or a part of a fief, which frequently happen after the 12 th century, they could not build a castle or fortified residence there; disputes often arose between a lord and his vassal relating to the nature of the structure erected by the lessee; many manor houses pretended to remain castles and to take the place of a defense, after the time in particular when the remaining barons were compelled to alienate their property.

a (strong) house could cause the country great injury, it was decreed that the squire Etienne de Breziac could not erect a house of that sort on the mountain designated." (Arrestat in pallam. 1264. Arr. 6).

Note 1.p.305. Doc. ined. sur l'hist. de France. I series. hist. polit.

By that intervention of the king's parlement in suits between vassals, an intervention caused by the royal bailiffs, a great lord possessing a fief held from a less powerful lord could no longer erect on it one of those fortified habitations, which would have dominated the country; he was compelled to content himself with a simple manor house, to which it was well understood that he could give all the importance of an actual castle, if he so desired, but not as a strong p place. Also at that moment when feudalism was seriously attacked, i.e., in the reign of Louis IX, that were built so many great manor houses in France. These manor houses although not having the visible signs of the feudal habitation, i.e., fortified towers, curtains and keep, as fiefs possessed the feudal rights, rights of hunting among others, for we see that n nearly always warrens belonged to the manor houses; now the warren, as proved by M. Champanniere,[2] was the exclusive right to hunt over the lands of the vassals, and not the right of raising rabbits in certain places. But the decrees of parlement [3] had admitted in principle, that the right of establishing new tolls, new warrens and new fish ponds belonged to the king alone. Thus on the one hand, the king by his organ of the parlement opposed, as much as possible, the building of fortified castles, and on the other refused sanction to the rights dearest to the lords, hunting and tolls, when those rights had not been established by previous possession. Besides the acquisition of a fief did not convey the prerogatives of the nobility, and if commoners purchased a fief or a part of a fief, which frequently occurred after the 13 th century, they could not build a castle or fortified residence there; disputes often arose between a lord and his vassal relating t to the nature of the structure erected by the latter; many m manor houses pretended to resemble castles and to take the place of a defense, after the teme in particular when the ruined great barons were compelled to alienate their properties.

It was so that during the 14 th and 15 th centuries France was
ravaged by under powers. Good and evil struggle fairly
struck the armed bands scattered over the country, and the
many houses of the occurrences of fires became cause artifi-
cially fertilized and manured in Alsatian [illegible],
so the causes of disorder at that time.

[illegible] 1924. p. 88 to 97.

[illegible] Ua. Vol. 88. Wyll. Ballit. 88. 88.

Note A.p.205. Wooden or Vitrine were enclosed or not, in
[illegible]

From the 13 th century the houses of the Germans, Dordogne,
Gor, Eure, Tarn and Aveyron, saw arise a great number of these
enclosed manor houses called for defense; instead in those dwel-
lings the first were much divided, and after the war of the
Albigenses, the great barons of the ruined southern provinces
were reduced to powerlessness. The soil was covered by proper-
[illegible] [illegible] [illegible] [illegible],
for this [illegible] [illegible] [illegible], on the [illegible] was
in it a process of secondary for [illegible] and of property [illegible]
and [illegible].

Those enclosed manor houses in the Southlands are designated
by the name of "castrum", and are still very common.

Not far from Bordeaux, at the entrance of the Landes is a
[illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]
[illegible], and [illegible] [illegible] [illegible] [illegible] [illegible]
of great interest; this castrum is called S. Vezard-en-Gille. The
Gille is a stream that has its source at that place called
head of the forest, and that runs into the Garonne.

The manor house of S. Vezard is built on the right bank of
the stream, which at that point winds and forms a meran. A
wide ditch surrounds this fortified habitation, whose plan
[illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]
drawn square with four little towers at the angles. The fron-
tay is at A and two sloping [illegible] in each side of the ground sto-
ry, whose soil is raised little above the level of the meran.
At the origin this square enclosure accounted a moreau meran-
ture, whose fastenings are still seen on the in ernal walls.
Inside of the two walls C C of a later epoch, there were four

It was so that during the 14 th and 15 th centuries France was covered by manor houses, that could protect their occupants against the armed bands scattered over the territory, and that many houses of the proprietors of fiefs became posts sufficiently fortified and enclosed to disquiet the country, and add to the causes of disorder of that time.

Note 2.p.305. De la pripriete des eaux courantes. Paris. 1846. p. 86 to 97.

Note 3.p.305. On this subject see a dreree of 1317. Les Olim. Vol. III. part. 2.1317. en. 65.

Note 4.p.305. Vivaries or Viaries were enclosed or not, in which were raised small animals and particularly rabbits.

From the 13 th century the banks of the Garonne, Dordogne, Lot, Gers, Tarn and Aveyron, saw arise a great number of these enclosed manor houses suited for defense; indeed in those provinces the fiefs were much divided, and after the war of the Albigenses, the great barons of the ruined southern provinces were reduced to powerlessness. The soil was covered by proprietors nearly equal in power and wealth; the English domination, far from changing that state of affairs, on the contrary saw in it a promise of security for itself and of prosperity for the country.

Those enclosed manor houses in the Bordelais are designated by the name of "casteras", and are still very common.

Not far from Bordeaux, at the entrance of the Landes is a manor house that seems to belong to the first half of the 13 th century, and which retains traces of internal arrangement of great interest; this castera is that of S. Medard-en-Jalle. The Jalle is a stream that has its source at that place called head of the forest, and that runs into the Garonne.

The manor house of S. Medard is built on the right bank of the stream, which at that point widens and forms a marsh. A wide ditch surrounds this fortified habitation, whose plan we give at the level of the ground story (1). This plan is drawn square with four little towers at the angles. The doorway is at A and two slots open in each side of the ground story, whose soil is raised little above the level of the marsh. At the origin this square enclosure surrounded a wooden structure, whose fastenings are still seen on the in ernal walls. Instead of the two walls O O of a later epoch, there were four

[illegible] completely the floor of the mezzanine, [illegible] and a half feet [illegible] walls. A wooden stairs permitted access to the second story. This ground story had no more than 8.7 ft. between floor and ceiling.

The second story [illegible] a very curious arrangement. It was a mezzanine for part of the area as proved; 1, by the fastenings of the joists and the trace of the door frames; 2, the narrow windows 8 8'8" are doubled in the height of the story and are separated by transels; 3, the great windows 0 0' 0" occupy the entire height of the story, are wide and divided in width by a mullion. That mezzanine was of wood, supported by the lower posts and there as d d'. Further on half timber construction supported the double posts, as we shall see presently. A wooden stairs P allowed access to the mezzanine. The 2 story hall R had 14.1 ft. between floor and ceiling, and even mezzanine about 7.5 ft.; so that the floor above that great and joists, rose to the level of the upper inner defensive gallery.

Taken in calculating these heights:--

Floor of floor	0.92	Total 17.05 ft.
Mezzanine story	7.55	
Beam of floor	0.09	
Height of great hall	14.11	
Peak and corbels	1.97	Total 17.05 ft.
Joists	0.98	

The score stairs T ascended from the floor of the great hall to the defensive gallery protected by a crenelated parapet. I are fireplaces and K are cupboards. At L are circular privies with soil duct indicated on the side of the ground story.

We give (4) a perspective of this manor house taken from the approach side. The masonry is entire except the crenelated parapets, of which only fragments remain.[1] All woodwork has been burned and has left numerous traces. The roof was probably 1 divided into two, according to the height of the constructions of that time, and contained lofts of half timber work on the level of the defensive gallery, as indicated by our view. On the front four square holes arranged in the structure [illegible] the sentrees were intended to receive a projecting [illegible]

great wooden posts, that supported the floor of the second s story, partitions and a half timber dividing wall. A wooden stairs permitted ascent to the second story. This ground story had no more than 8.7 ft. between floor and ceiling.

The second story (2) presents a very curious arrangement. It was a mezzanine for part of the area as proved; 1, by the fastenings of the joists and the trace of the door frames; 2, the narrow windows B B′B″ are doubled in the height of the s story and are separated by lintels; 3, the great windows C C′ C″ occupy the entire height of the story, are wide and divided in width by a mullion. That mezzanine was of wood, supported by the lower posts and those at d d″. Further tha half timber partition supported the double roofs, as we shall see presently. A wooden stairs P allowed access to the mezzanine. The g great hall R had 14.1 ft. between floor and ceiling, and each mezzanine about 7.5 ft.; so that the floor above that great hall and that over the mezzanine, including the depth of beam and joists, rose to the level of the upper inner defensive gallery.

Indeed in calculating these heights:--

The mezzanine story	7.55	
Depth of floor	0.98	Total 17.06 ft.
Mezzanine story	7.55	
Depth of floor	0.98	
Height of great hall	14.11	
Beam and corbels	1.97	Total 17.06 ft.
Joists	0.98	

The screw stairs N ascended from the floor of the great hall to the defensive gallery protected by a crenelated parapet . I are fireplaces and K are cupboards. At L are outside privies with soil duct indicated on the plan of the ground story.

We give (3) a perspective of this manor house taken from the entrance side. The masonry is entire except the crenelated parapets, of which only fragments remain.[1] All woodwork has been burned and has left numerous traces. The roof was probably d divided into two, according to the habits of the constructors of that time, and contained lodgings of half timber work on the level of the defensive gallery, as indicated by our view. On the front four square holes arranged in the structure above the entrance were intended to receive a projecting defensive

gallery, to which one descended from the lower gallery. We ma-
[illegible] of this radio [illegible] and in
place. This method consists in enclosing a wooden building by
a [illegible] [illegible] [illegible]
use is employed in many of those square keeps of the 12th to 1
[illegible] [illegible] [illegible]
used that the half stones work or rather the lower courts ma-
ve have been replaced. For in one 14 to or 15 th century were
built the two walls round on the plan of the second story.

*Note 1.p.209. See Mortice sur le costera pres de S. Maiord-
en-Joille, by X. Dumont. 1889. (Recueil de l'accademie royale
de Bordeaux. Lecture of Feb. 21. 1879.*

[illegible] (and of 12 m or continued of 14 m centuries), tank reservoirs
in the arrangement that of S. Medard-en-Jalle, but in which a
masonry has replaced the internal wooden partitions; this is
[illegible] [illegible] [illegible]
images the moats of the Dordogne, and was formerly surrounded
by ditches. The entrance of this manor house (4) was at C and
[illegible] [illegible] [illegible]
[illegible] wall. The door opening into a first hall [illegible] wh-
ich accounts from the bottom. From that first hall one pas-
sed into the three other rooms, originally pierced only by
slots intended to serve the ditch. As S is an open that pas-
[illegible] [illegible] [illegible]
could only serve as a storehouse for provisions, or as a refu-
ge in time of war. The second story (see plan B) was designe-
d for habitation. It is divided into five rooms a very r
[illegible] [illegible] [illegible]
have fireplaces I. In room L opens a mashoolations K to cover
the entrance doorway. From the rooms L and M one passes into
the angle tower P containing the privies, and into the passa-
ge furnished with slots that strike the ditch beside the ent-
rance. Two rooms placed on the side walls and on the division
wall over this passage, [illegible] [illegible]
with basilisques on its four fronts. Slots pierced in the ma-
son towers defend the angles and flank the fronts. The rooms
of the second story were lighted by narrow windows, now repla-
ced by modern windows. This [illegible] [illegible]
[illegible] [illegible] [illegible] Pas. [illegible] [illegible]

gallery, to which one descended from the inner gallery. We ha-have presented one of the frames of this outer gallery set in place. This method consists in enclosing a wooden building by a fortified wall of stone, and is curious to observe, for we see it employed in many of those square keeps of the 1M th c century such as that of Loches, for example. It is to be presumed that the half timber work or rather the lower pposts must have been replaced, for in the 14 th or 15 th century were built the two walls shown on the plan of the ground story.

Note 1.p.309. See Notice sur le costera pres de S. Medard-en-Jolle, by M. Dumont. 1839. (Recueil de l'ocodemie royble de Bordeaux. Lecture of Feb. 21. 1839.

There still exists in Gironde a manor house of a later epoch (end of 13 th or beginning of 14 th centuries), that resembles in its arrangement that of S. Medard-en-Jalle, but in which m masonry has replaced the internal wooden partitions; this is the manor of Camarsac; situated on quite a high point, it dominates the mouth of the Dordogne, and was formerly surrounded by ditches. The entrance of this manor house (4) was at C and was protected by an external gate placed at right angles to t the front wall. The door opened into a first hall D with stairs ascending from the bottom.[2] From that first hall one passed into the three other rooms, originally pierced only by slots intended to strike the ditch. At G is an arch that bears the partition built in the second story. This ground story could only serve as a storehouse for provisions, or as a refuge in time of war. The second story (see plan B) was designed for habitation. It is divided into five roomswith a very i ingeniously arranged central communication. Four of these rooms have fireplaces I. In room L opens a machicolation K,to cover the entrance doorway. From the rooms L and M one passes into the angle tower F containing the privies, and into the passage furnished with slots that strike the ditch beside the entrance. Two roofs placed on the side walls and on the division wall cover this castera, which was crowned by machicolations with battlements on its four fronts. Slots pierced in the watch towers defend the angles and flank the fronts. The rooms of the second story were lighted by narrow windows, now replaced by modern windows. This castera or manor house was an actual keep aud offered a very safe refuge. Fig. 5 gives the per-

perspective view of this fortified habitation, taken from the entrance side.[1]

Note 2.p.309. The tower E as well as the watch tower F were modified in the 15 th century; greater dimensions were given to them.

Note 1.p.311. These drawings were furnished to us by M. Alaux, architect at Bordeaux.

In England some manor houses of the 1, th century present arrangements nearly similar to these, notably that of Belsay (Northumberland). It is certain that these casteras were only the principal building of a group of rural structures surrounded by a wall or ditch; it was the habitation of the possessor of a fief. During the 14 th and 15 th centuries the manor houses adopt more frankly the arrangement of a country habitation, even in the southern provinces. Thus at Xaintrailles near Nerac, one still sees the quite entire remains of the m manor house where was born the celebrated Pothon. This manor house dates from the first years of the 15 th century (6). It consists of a bailey or lower court B now occupied by modern buildings. The road A leading to the manor house gives a entrance into that lower court by a first gate A'. Passing o over a ditch, one enters the internal court E by a carriage or a postern. From the passage from the gate one enters the room F, where was the doorkeeper or a guard at need. The great hall as at G and the kitchen at H with a door to the court. At the left is another great hall I into which one enters by passing over the lower landing of the graud stairway K. At L is a little keep wit external stairs M and internal screw stairs. The keep is only connected to the two main buildings by curtains, now enclosed within the recent structures. These two buildings are only defended by battlements at the base of the reof and by four watch turrets at the angles. The manor h house H is surrounded by gardens at the left side and behind the keep. This entirety is very well preserved, except the p part a b behind the grand stairway and the right hand building, that has been demolished, and whose foundateiosalone are now perceived. Fig. 7 gives a perspective view of the manor house Xaintrailla, taken from the gardens.[1]

Note 1.p.313. Part of this manor house was still occupied in 1843 by the marquis of Lusignas.

Note 2.p.318. The manor house of Launay, which was the residence of Bontemps.

Near Nesles are still preserved the remains of a pretty manor house of the end of the 16 th century.[2] It was surrounded by a polygonal enclosure with ditch and defended gate. A rectangular tower, narrow and crowned by 4 machicolations served as an oratory in the ground story and watch tower at top; it further commanded the entrance. Modified in the 17 th century, and again more recently, the inhabited buildings have lost t their character, and only show plastered walls; they serve today for the cultivation of the surrounding lands. (8).

Note 2.p.313. The manor house of Launay, which was the residence of Santeuil.

In vignettes of manuscripts of the 15 th century, one sometimes sees manor houses very well drawn, that recall the arrangement of those just given in the last place, and they give a collection of structures grouped without symmetry, but according to the needs of the inhabitants.

Many of those manor houses of the beginniug of the 15 th c century and tolerably defended were opened in the 16 th, their external walls were pierced by windows, and the ditches were partly filled and replaced by terraces.

Such is the manor house of Sedieres, a view of which is given (9). This manor house was built during the first years of the 15 th century, and is composed of the square tower A, the main building B and the porter's lodge C. The other buildiugs E were probably lower and enclosed the internal court D. In the 16 th century windows were pierced in the exterion of the old building; the interiors were rebuilt, and buildings now almost entirely demolished rose at E and F; the ditches were filled at the garden side. Thus those manor houses of the middle ages, whose first possessors had built fortified residences, were changed in the 16 th century into pleasure houses, of their ancient character only retaining machicolations that had become useless,and portions of the ditches before the doors.

The chateaus of Rambouillet, Nantouillet near Paris, Rochefoucauld in Angoumois, Villers-Cotterets and Compeigne, were only manor houses under the reign of Francis I, by reason of the work of adaptation executed to open them to the exterior and to take away their character as fortresses.

The 16 th century erected a quantity of manor houses of which ruins exist. We shall cite among others the manor house

of Ango near Dieppe built by the celebrated privateer captain about 1525. "He had acquired the beautiful lands of Varengeville," says M. Vitet in his excellent history of Dieppe,[1] "the ancient domain of the family of Longeuil; the beauty of the country, the vicinity of Dieppe, led him to demolish the old castle and build for himsel a manor house in modern style after his fancy. That is the manor house of which still remain some buildings converted into farm buildings, but which by an old custom, the inhabitants of the country know and designate only by the name of the chateau." This manor house had considerable extent, since Ango could receive king Francis I in it. But as we have already stated, the manor housesreplaced the castles in the 16 th century. Azay-le-Rideau, Meillant, Chenonceaux and Anet, by their arrangement and purpose belong to manor houses rather than to chateaus, and singularly approach the antique villa. The symmetrical chateau of the reign of L Louis XIV caused the last traces of the manor house to disappear, since from that epoch simple country houses have sought to copy on a small scale those ponderous and regular masses, that in France particularly distinguish the chateau of the e end of the 17 th century from all habitations of the preceding centuries. But there is in the arrangement of the great chateaus of the 17 th century, such as Richelieu, Coulommiers, M Maisons, Monceaux, Vaux, etc., a certain amplitude and dignity, that suits those princely habitations, and that reflects the broad existence of the lords of a powerful country, who did not need to shut themselves within their resdicences,like the barons of the middle ages; that amplitude and majesty being reduced to the proportions of the dwelling of a citizen served by two or three domestics became ridiculous. Therein our neighbors in England knew better how to keep the scale, and their little country houses are good today, the dwellings of private men with modest fortunes and tastes, and who prefer the internal convenience to the vain satisfaction of erecting a diminutive of a chateau.

Note 1.p.316. Histoire de Dieppe. Part IV. p. 451.

MARBRE. Marble.

Crystallized limestone, hard and receiving a polish. -- In France marble was little used during the middle ages; first

Note 1.p.217. For example, of the cathedral of Lugos.

The doors and cornices of the white ones do not fail to
[illegible] marble [illegible], [illegible]
tion proves that the use of that material was reserved as an
extraordinary luxury. Above this rounds their monasteries
[illegible] 17 [illegible], or [illegible]
replaced their sections, did not only to section numerous works
in marble, that never existed. These are very common [illegible]
les among those chronicles. Then it is said that Sater caused
marble columns to be brought from Italy for the enclosure of
the sacristry of the abbey church of S. Denis; now those colu-
mns are of hard stone from the quarries near Pontoise. Common
people also frequently give the name of marble to certain [illegible]
[illegible], they [illegible] [illegible]
have the qualities of marble.

Even the sculptors of the middle ages [illegible] [illegible],
they have done it to their honor; to be masters of this, it
suffices to see at S. Denis quite a large number of statues
of white marble from the 14 to and 15 th centuries, that are

because that material is not very common, then because its use requires considerable expense. The Romanesque architects of the first times often robbed antique monuments of their columns and capitals to apply them to new buildings; even u under the first Carlovingians by a reminder of Roman traditions, they sometimes carved marble capitals, but those examples are rare. This hard material takes long to work and could not suit artists, who no longer had sufficient resources to complete works of that nature. But in the South of France, the use of marble did not cease until about the middle of the 14 th century, principally in the vicinity of the Pyrenees. There exist several cloisters in those southern provinces, whose columns and even capitals are of marble.(Art. Cloitre). Men also sometimes employed colored marbles as inlays during the 11 th, 12 th and 13 th centuries,[1] and for pavement, and white marble for altars, reredoses, tombs and statues. The system of construction adopted at the end of the 12 th century in France further did not lend itself to the use of marble, that even in Roman antiquity (except when it relates to isolated points of support like columns), was only applied as some form of facing.

Note 1.p.317. For example, at the cathedral of Lyons.

The poets and chroniclers of the middle ages do not fail to mention works of marble, marble palaces, stairs and chambers. Which proves that the use of that material was regarded as an extraordinary luxury. Abbots that rebuilt their monasteries during the 11 th and 12 th centuries, or contemporaries that related their actions, did not omit to mention numerous works in marble, that never existed. Those are very common hyperboles among those chroniclers. Thus it is said that Suger caused marble columns ts be brought from Italy for the enclosure of the sanctuary of the abbey church of S. Denis; now those columns are of hard stone from the quarries near Pontoise. Common people also frequently give the name of marble to certain hard limestones, that take a polish, but which however do not have the qualities of marble.

When the sculptors of the middle ages desired to cut marble, they have done it to their honor; to be assured of this, it suffices to see at S. Denis quite a large number of statues of white marble from the 14 th and 15 th centuries, that are

of excellent work. (Art. Statuaire).

The museums of Toulouse and of Avignon also possess many r remains of marble monuments from the 12 th, 13 th, 14 th and 15 th centuries, of beautiful work.

MARCHE. Market.

A covered place of sale. (Art. Halle).

MARQUETERIE. Marquetry. (Art. Menuiserie).

MENEAU. Tracery. Mullion.

Seldom used in the singular number. -- This name is given to the mullions and compartments of stone, that divide the surface of a window into several open spaces, that are filled either by fixed glass, or by opening sashes, also glazed. (Art. Fenetre). In Italy, Spain and likewise in France, during the first centuries of the middle ages, the windows of public edifices were often without glass; lattices of stone, metal or wood, were then set in their openings to soften the light and to prevent the wind and rain from penetrating into interiors. When the use of glass became habitual about the 11 th century, the openings were filled with glass maintained by wrought iron cross-bars. But about the end of the 12 th century at the time of the adoption of the system of architecture called Gothic, the windows being enlarged, it was necessary to arrange in their open areas stone divisions to support the glass; for those iron armatures were difficult to make, flexible and did not offer sufficient resistance to the force of the wind. Besides, those wide and high openings, if left void, would have no happy effect; they did not give the scale of t the structure, and the architects of the lay school at the e end of the 12 th century possessed sufficiently the feeling of proportion not to leave great void surfaces without occupying them by stone compartments, that could recall their dimensions. These divisions are seen to appear about the first years of the 13 th century in Ile-de-France, Soissonais, Beauvoisis and Champagne. These first mullions are composed of stone and are built. Such are the mullions of the cathedral of Soissons and of the cathedral of Chartres. The tracery of the windows of the chapels of the choir of Notre Dame of Rheims,

although dating from about 1215, is still composed of courses or of voussoirs (Art. Fenetre, Figs. 13, 14, 15, 16, 17 and 18). But soon the lay school of the 13 th century made of the tracery actual stone sashes formed of mullions set on end and of perforated compartments cut from slabs more or less thick, according to the dimensions of the openings. In vaulted edifices, like the churches and great assembly halls, whose windows occupy all or nearly all the surface left under the side arches of the vaults, the tracery is at first composed of a central mullion with two pointed arches surmounted by a circle. Such are the upper windows of the choir and nave of the cathedral of Paris, rebuilt about 1225. (Art. Cathedrale, Figs. 3 and 4). Now the tracery of the upper windows of Notre Dame of Paris can be regarded as the first made in the manner of rigid stone sashes, between jambs and arches constructed of courses.

It is interesting to see how the architect introduced those stone sashes in the old windows of the 12 th century, and how the tracery was cut. The upper windows of the choir of Notre Dame of Paris had been constructed about 1170. They consisted (1), according to sketch A, of jambs with little columns on t the outside (see horizontal section B made on a b) surmounted by two equal concentric arches with a row of dentils added to the extrados. At D was the band covering the shed roof placed over the gallery, and at E the rose window opening beneath t that shed roof above the vaults of that gallery. (Art. Cathedrale, Figs. 3 and 4). The system was then new, of tracery allowing very wide windows to be filled by colored glass, and had so strongly charmed the bishops, chapters and their architects, that they did not hesitate to destroy the rose windows E, the old window sills J of the 12 th century, to replace t the shed roofs by terraces, tn cut the jambs F, and to remove the inner arch of the opening. That being done, they cut in the remaining stones the little columns G inside and outside; inserted blocks H in the places left void b: removing the voussoirs of the rose window, as indicated by the hatched outline, placed the mullion I in the middle of the openings and jointed on this mullion and on the recut jambs the upper stone sash composed of two arches and of a circle. The curvature of the arches of the original window was then changed, and between

the extrados of the stone sash and the intrados of the second arch of the 12 th century, left in place, was inserted the f filling K. The joints of this stone sash marked in our Fig., were cast with lead and iron dowels set as indicated by the detail L. It is to be presumed that the fear of the architects to see the arches of the old windows bend, weakened by l losing a row of voussoirs, determined them to give greater sharpness to the equal arches of the tracery. Each tracery is composed thus:- 1, of the little central column, whose section we give at m; 2, of the forked middle impost; 3, two lateral imposts; 4, two closers of the lower arches; 5, four lateral voussoirs; 6, the keystone of the circle and two upper closers, in all 13 pieces of stone for a window 32.8 ft. high by an average width of 11.2 ft. But the void spaces left between these stone divisions were still too large to be glazed without the aid of iron. A transverse rod passing through the springings of the arches at N and crossing the head of the c capital P was set in constructiug the sashes. Bars O were fixed between the jambs and the central mullion and formed a series of rectangular panels; vertical bars R again served to diminish the width of the two openings and formed the border of the glass. In the circle 4 bars S also divided the void s surface of the circle. These bars were fixed in the circular sash. One will note that the joints of the tracery always radiated from the centres of the circle or of the pointed arches.

But already the windows of the chapels of the choir of the cathedral of Rheims, contemporaneous with those given below, possessed tracery constructed in courses, that in the upper circle constructed cusps intended to reduce the open area of those circles. (Art. Fenetre, Fig. 18). In this case as always, to Champagne are due the innovations in Gothic architecture. The upper windows of the nave of the choir of Notre Dame of Rheims, although built about the middle of the 13 th century, have sanctioned the principle adopted by the primitive a architects of that incomparable edifice. Those windows are further indicated in the sketch of Villard of Honnecourt before the resumption of the work on the cathedral in 1241, thus as a composition belonging to an earlier epoch. They consist of a central mullion supporting two pointed arches with a circle divided by cusps into 6 lobes (2). The tracery is represen-

reproduced at a larger scale than those of the chapels. The openings are not less than 7.5 ft, hence they were fitted w with strong iron armatures. The cusps of the circle are set in a groove, as indicated in section A made on a b. The rebate supporting the glass is made inside, as seen in the horizontal section B made across the central mullion, the exterior b being at E. The glass panels are held in the circle by means of keyed pins d fixed in the insides of the cusps. The iron armature of that circle is itself fixed on the inner face of the cusps. The section C of the two little arches have as generator an equilateral triangle, the centres of the arches b being taken at the imposts of the curves. One will also note that second row of little columns supports the round forming the principal member of the tracery, but that those rounds do not follow the curve of the great arch; so that the round of the circle penetrates the great bevel X, and that circle appears circumscribed by the archivolt, but independent of its profile, so that the tracery seems to be only a sash inserted and not forming part of the architecture, but the whole still being made with the structure. The system adopted by the primitive architect of the cathedral of Rheims, and scrupulously followed by his successors till the end of the 13 th century, was not the independent mode dated from 1240. Already at that epoch, they claimed to no longer leave such wide spaces for the glass panels. The windows occupying the entire width between the piers, a single mullion did no always suffice; they desired to divide these spaces when very wide, and instead of two spaces established four, so as no longer to have to glaze spaces over 3.3 to 4.3 ft. wide at most. But that extension of the principle presented difficulties; for nothing could serve as an example at that epoch, neither in antique nor Romanesque architecture, nor in oriental architecture. The architect that conceived the first plans of the cathedral of Amiens, Robert of Luzarches, but who saw arise only the lower p parts of the nave, had arranged the windows of the side aisles according to the system adopted for the windows of the cathedral of Rheims; a central mullion, two equilateral arches and a circle with cusps set in a groove.

His successors having to glaze the enormous upper windows of the nave, that are 19.7 ft. wide by 42.7 ft. high, thought

of filling those spaces with stone tracery sufficiently strong and close to be able to set the glass panels in its openings without having recourse to that mass of ironwork, that we see applied to the windows of the cathedral of Rheims. But they all started from the same principle; they established the principal skeleton according to the method adopted at Notre Dame of Rheims, i.e., composing it of central mullion supporting two equilateral arches with an upper rose window; but in those two great intervals left between the jambs of that central m mullion, they made a second stone sash, composed in the same manner; and a middle mullion supporting two equilateral arches and a circle. This system of crystallization, i.e., by infinite repetition of the accepted principle, we see rigorously applied from the end of the 13 th century in Gothic architecture, but it did not at first attain its logical results; there was groping, and there appeared difficulties in execution, which were but imperfectly solved. The upper windows of the nave of the cathedral of Amiens are certainly one of the first experiments, for their construction cannot be later than 1235. Those windows (3) [1] are composed, as everyone knows, of a central mullion built in high courses, of two dividing mullions of smaller section and composed of stones set on end, of two complete equilateral principal arches with a great upper rose window, of two complete equilateral arches resting on the dividing mullions with their secondary rose. Those secondary equilateral arches bear their round continuing the s section of the dividing mullions, and this member or round p penetrates the splays of the jambs and of the central mullion, as shown by the perspective sketch A. As for the secondary roses B and C, their section is independent and does not participate in the members that they penetrate. One will even observe that being troubled by the jointing, the constructor has placed the cusps of the rose B in a groove like those of the great central rose. (At E we give at double size the section of these secondary roses on a b.

Note 1.p.328. See the entirety of the composition of those windows in Art. Fenetre, Fig. 10).

At Amiens the constructors possessed only materials of quite moderate resistance and of rather small dimensions; they thus experienced difficulties in constructing those enormous trace-

traceries, and must multiply the joints to avoid too large p pieces of stone. Now if attention be paid to the jointing that we have accurately reproduced, one will see that in fact the blocks have only ordinary dimensions, and that the joints are traced in a manner to avoid ruptures to be feared in those w works of tracery. As it always happens, it is not the simplest means that first presents itself to the minds of those that invent. This tracery with its raised sections, cusps in grooves, certainly offers difficulties in drawing and cutting, of penetrations not easily taken into account by the stonecutters, of disford between the principal and secondary members, t thin and thick parts, breaks in the curves at the points I, f for example; yet already the architects had caused the round or member G to extend entirely around the archivolt, continuing the section of the little column H and penetrating the m member of the great rose tangentially.

This was an advance in drawing from the tracery of the windows of Notre Dame of Rheims. But however rapidly one proceeds, he does not arrive at simple methods and practical procedures without experiments. To give a drawing at reduced scale of t the open compartments of a window and a single section to suffice to make the drawing at full size was evidently the aim to which the architects must tend. It was essential to discover a method. It was also necessary to avoid disproportion between the openings, i.e., to distribute them in such manner, that they should not be too crowded or too far apart. It was essential (since the system was adopted of no longer having iron armatures of great areas) to make a network of stone equally close to avoid those heavy, complicated and expensive curvatures. The architects of the upper nave of the cathedral of Amiens must have perceived the disproportion existing between the roses of the tracery, the heaviness of the secondary equilateral arches enclosing the lower roses, the difficulty of cutting those penetrations of members of different sections. Thus erecting a little after the upper windows of the nave, those opened in the western wall of the transept, they had already made improvements in drawing the tracery of these windows.(4).

Raising the imposts of the archivolt above the capitals of the mullions, they could give a smaller diameter to the princ-

[illegible] cases, finding cavities can easily have myriadvarying arcuses and are the secondary auxiliaries arises a with some, that they filled with teeth, which no longer have a diminutive of the central rose. In the central rose instead of simple cases, they conserved the cases at A, which greater fixed the void area and diminished the importance of the iron arcuature. Further, they added the cases E to the lower coniaceral arcuses. This general drawing is evidently better conceived than that given in Fig. 3; but also the work of the detailer and the schoenchter is simplified. One will observe in this drawing, that the cases alone of the central rose are set in a groove (see section C made on a b); all other members are [illegible] in the [illegible]. Further, a [illegible] is the generatrix of all members; thus the central molition is the section D E F. The secondary molitions are given by the [illegible] section G H F. The cusps of the lower coniaceral arcuses above the section K E L. As for the section made on a d, it is given by D E M. By means of that combination, the axes alone of the principal rounds P and of the rounds or little secondary columns S being drawn, and the section D E F with its derivatives being given, the entirety of the tracery was [illegible]. There was [illegible] mined besides that combination the cusps of the central rose. All the profiles of that section D E F revolve, save the exception admitted only for the arcuses T of the secondary coniaceral arcuses and of the central rose, which takes the simplified section D M D. One will also note, that in this drawing the joining is infinitely more simple and natural than in the [illegible]. [illegible] one from the centres of the coniaceral arcuses and at the same time from the centres of the lobes. These joints were then always normal to the curves, avoiding sharp points and [illegible]. Finally, the arcs [illegible] are joined to simple [illegible] arcuses, and to some [illegible] lines.

Yet in that intricate combination, experiments are still a necessity, and no general method controls the starting point of the drawing. We shall see that the accidents of the same [illegible] [illegible].

principal rose, finding between the small lower equilateral arches and the two secondary equilateral arlhes a wide space, that they filled with trefoils, which no longer gave a diminutive of the central rose. In the central rose instead of simple cusps, they conceived the cusps at A, which better fitted the void area and diminished the importance of the iron armature. Further, they added the cusps B to the lower equilateral arches. This general drawing i. evidently better conceived than that given in Fig. 3; but also the work of the detailer and the stonecutter is simplified. One will observe in this drawing, that the cusps alone of the central rose are set in a groove (see section C made on a b); all other members are included in the general jointing. Further, a single section is the generatrix of all members; thus the central mullion is the section D E F. The secondary mullions are given by the d derived section G E H. The cusps of the lower equilateral arches adopt the section K E L. As for the section made on a d, it is given by D E M. By means of that combination, the axes alone of the principal rounds P and of the rounds or little s secondary columns S being drawn, and the section D E F with its derivatives being given, the entirety of the tracery was obtained without difficulty by the draftsman. There only remained besides that combination the cusps of the central rose. All the profiles of that section D E F revolve, save the exception admitted only for the extrados T of the secondary equilateral arches and of the central rose, which takes the simplified section D M D. One will also note, that in this drawing the jointing is infinitely more simple and natural than in the preceding drawing. Without difficulty the joints radiate from the centres of the equilateral arches and at the same time from the centres of the lobes. These joints were then always normal to the curves, avoiding sharp points and consequently the causes of breaks. Finally, the iron armatures are reduced to simple bars fitted with staples, and to some light secondary bars.

Yet in that ingenious combination, experiments are still a apparent, and no general method controls the starting point of the drawing. We shall see that the architects of the same edifice soon arrived at sure methods, to rules given by geometrical combinations.

The windows of the choir chapels of the cathedral of Amiens are contemporary with those of the S. Chapelle of Paris, and date from 1240 to 1245; now the tracery of these windows is drawn according to a very simple and very good geometrical p principle. It must be stated that this tracery consists of a single central mullion supporting the tracery beneath the archivolt. (Art. chapelle, Figs. 39,40.

Let (5) at A be the horizontal section of one of those windows with its central mullion B. Let the lines B B′B″ pe the axes of the central mullion and of the little columns of the jambs. One will first note that the same section is adopted for the central mullion and for the jambs. Let the line C D be the springing of the arch that must terminate the window. The space between the two axes E and F, half the width of the window, is divided into four equal parts E f, f G, G h, h F. From the point f, taking the half thickness of the column or round, that half thickness is laid off on the base line to f′. From the point h that half thickness is laid off to h′. Taking the length E h′, it is laid off on the base line to h″. On th that base h′ h″ is erected the equilateral triangle h′ h″ H. On the base f′h″is also erected the equilateral triangle I f′ h″, and from the apex H of the great equilateral triangle is drawn the little equilateral triangle H i′ i, similar to I f″ n″. Then taking the length e f″ and the apexes I f′h″ and H i i′ as centres, the trefoils are described. Takiug the points h″ and h″ as centres of the length h″ O as radius, the g great arc O p is described. To find the centres of the two lower equilateral arches, from the points f′ and h′ are drawn two lines parallel to h″ I and f′I; these two parallels meet the lower arcs of the trefoil at l and l′. On these two lines, from l to m and from l′ to m″, one takes a width equal to the little column or round. From these two points m and m′ are dr drawn two parallels to m g′ and m′g; those two parallels meet the internal lines of the rounds at n and n′; hence the two triangles m n g′, m′ g n′ are equilateral, and taking the points g and g′ as centres and the length g n′ as radius, one traces the lower equilateral arches. At T we have drawn half the tracery with the thickness of the mouldings. Thus all s sections normal to the curves give the generating section of the central mullion B.

The joining is simple, logical and stable, for all sections are actually an extension of the tracery. Tracery [illegible] was based on the orders of [illegible] always retains its same curvature, which is the most essential rule for tracing the openings of the tracery. For the middle of the 13 th century, the tracery is always drawn according to refined geometrical methods, as least in the edifices erected in Ile-de-France, Champagne and Picardy. Among this tracery, [illegible] produced by a simple geometrical method or-resting no difficulty to the draftsman. We shall further see proof. At first [illegible] sections in the same window; they adopted a single section, even for the tracery of windows of four bays, like the window of the abbey church of S. Denis (Abb. Renerre, Fig. 24). The-[illegible] by means of [illegible] lines of the sections of the tracery. This [illegible] as a small scale, following the geometrical method, and thus to permit drawing the details on the workyard without danger of errors.

The [illegible] from the second half of the 13 th century (about 1250), is a drawn according to this principle, i.e., that with the drawing which we give here of one of those windows and a section of the moulion at full size, the details can be made for the construction of the glass panels. That was a considerable advantage [illegible] and even across, for drawings sent by our monkeys of the [illegible] by our lay school and spread over the entire extent of [illegible] Spain, was such that the architects had been compelled to seek [illegible] tracing. [illegible] tions.

In Abb. Construction, p. 127 et seq., with regard to the construction of the church of S. Marie of Carcassonne, we have shown that the most complicated combinations of lines could easily be transmitted by the aid of drawings made as a

The jointing is simple, logical and stable, for all sections are normal as indicated by the drawing T. Without experiments the round at the points of junction of the two curved figures always retains its same thickness, which is the most essential rule for drawing the openings of the tracery. From the middle of the 13 th century, the tracery is always drawn according to refined geometrical methods, at least in the edifices erected in Ile-de-France, Champagne and Picardy. Among this tracery, that whose design appears most complicated is often produced by a simple geometrical method presenting no difficulty to the draftsman. We shall furnish the proof. At first the architects of that epoch avoided tracery with different sections in the same window; they adopted a single section, even for the tracery of windows of four bays, like the windows of the abbey church of S. Denis (Art. Fenetre, Fig. 24). Therefore it is further only necessary to trace the compartments by means of the axial lines of the sections of the tracery. This principle also permits one to treat without difficulty windows with one, two, three or four mullions, to trace compartments at a small scale, following the geometrical method, and thus to permit drawing the details on the workyard without danger of errors.

The tracery of the windows of S. Urbain of Troyes, that date from the second half of the 13 th century (about 1260), is d drawn according to this principle, i.e., that with the drawing which we give here of one of those windows and a section of the mullion at full size, the details can be made for the cutting of the glass panels. That was a considerable advantage in a time when many monuments arose in the French provinces and even abroad, for drawings sent by our architects of the royal domain. The extraordinary influence that the style adopted by our lay school had acquired over the entire extent of the territory actually French, over a part of Germany and of Spain, was such that the architects had been compelled to seek methods of drawing, that were not subject to false interpretations.

In Art. Construction, p. 197 et seq., with regard to the c construction of the church of S. Nazaire of Carcassonne, we have shown that the most complicated combinations of lines c could easily be transmitted by the aid of drawings made at a

small-leaded; the wonderfully-lost cupola be given by an over-
ner sufficiency to the architrave to which belonged brackets
of indestructible masonry, and so many other observations, in-
vent not mere, that no small trouble is easily under the va-
lidity of one architecture with empire confidence in the more
of interpreting them. Architecture is worthy to be regarded
as an art, only as it leaves exists the basis of the artist,
and then it can be great. Then one cannot in nineteenth terms
the exception and to space, as to speak, on the monument just
like created on paper, there cannot be a presence of possessi-
ng analogies. Such as Angus remark upon the main-tresses
to artists, who know what they desire, and who combine an en-
tire reality in their hands before constant the architect, but
as then examine the tracery of the windows of the choir of S.
Urbain of Troyes. (5).

*Note 1.p.229. There is no need here to recall how many tim-
es, even at Paris, that we have lately seen men remove and
rebuild on the monuments themselves; this is a mode of seeking
the good or the better, that is necessary everywhere, wherever
the trade is in honest and strong hands commencing the exercise,
all hasty this liberty has not limitations, and then really not
an absolute already not safe relative to the [illegible] -
for some masses.*

Let O be the image of the writer. In that rule, that ex-
ne the type of his result or likely volume of the basis lar-
ing as source the half section of the million, is drawn the
equilateral arch O D A, then the base O D of the two circular
[illegible] [illegible].

Bisecting the equilateral triangle by the axis E F and by two lines O G and
O H passing through the middle of the lines O A and O F, the
fig. E X I J is obtained, in which we inscribe the circle wh-
ose centre is on the axis at V. Varying on the lines I O and
J O two points V' V" at distances equal to the length I V, t
two other circles are drawn with radii equal to that of the
circle with centre at V. It is clear that these two circles
are tangent and are inscribed in the great pointed arch. Then
[illegible] the [illegible] [illegible] [illegible] A, B, H and I.
and bisecting each of these divisions, we erect verticals from
the points V and O. Like O P that cuts the circumference of t
the circle V" at P. From this point P with a radius equal to

small scale; the superiority that should be given to us over our predecessors by six centuries by more extended knowledge of descriptive geometry, and so many other advantages, is however not such, that we could transmit as easily today the details of our architecture with entire confidence in the mode of interpreting them. Architecture is worthy to be regarded as an art, only as it leaves entire the brain of the artist, and that it can be drawn. When one comes to experiment during the execution and to erase, so to speak, on the monument just like erasing on paper, there cannot be a pretense of possessing architecture.[1] Such an epoch cannot show too much respect to artists, who know what they desire, and who combine an entire edifice in their heads before opening the workyards. Let us then examine the tracery of the windows of the choir of S. Urbain of Troyes. (6).

Note 1.p.329. There is no need here to recall how many times, even at Paris, that we have lately seen men remove and rebuild on the monuments themselves; this is a mode of seeking the good or the better, that is somewhat expensive. Formerly one tried it on paper; but once having commenced the execution, all parts held together and were conjoined, and thus could not be changed without its being possible to give serious reasons for those changes.

Let A B be the width of the window. On that width, that gives the axes of the rounds or little columns of the jambs having as section the half section of the mullion, is drawn the equilateral arch C D E, then the base C D of the two circular arcs circumscribe the equilateral triangle. Divideng this equilateral triangle by the axis E F and by two lines C G and D H passing through the middles of the lines D E and C E, the Fig. E K I L is obtained, in which we inscribe the circle whose centre is on the axis at M. Marking on the lines L C and L D two points M′ M″ at distances equal to the length L M, t two other circles are drawn with radii equal to that of the circle with centre at M. It is clear that those two circles are tangent and are inscribed in the great pointed arch. Then dividing the width A B into three equal parts A a, a b and b B, and bisecting each of these divisions, we erect verticals from the points N and O, like O P that cuts the circumference of t the circle M″ at P. From this point P with a radius equal to

b 3 as from the equilateral triangle 2 b 3. Then we have the points b 3 as centres and the length b 3 as radius, we trace the three lower pointed arches; we seek or that base 2 3 the impostes a and b are being tangent to the two circumferences W' W''. All these lines from the axes X of the tracery, whose section we have given at Y. The darker portion Z on that section Y gives the section of the cusps. The axis o of these cusps is at a certain distance from the axis X and must not be confused with that. To trace the cusps we then take that distance inside the intersects of the circumferences of the circles and of the lower pointed arches. For the cusps of the circles, m being the point marked on the axis at the distance X f given by the section of the tracery, one divides the distance m M into two equal parts; from the middle point m' and taking m'm as radius, we trace the cusps with four circular loops. As for the cusps of the lower pointed arches, they are being placed on the base line 9 2. The cusps of the cusps 9 of the circle with one circular iron armature fixed to top f

The jointing of the tracery is indicated by lines 4, etc. At 8 8 is given the detail of the capitals. This tracery that is only 3.8 ins. thick by 9.0 ins. deep, suffices to maintain the arch from sill to crown, and they also rest on a perforated gallery (Art. construction, Fig. 103): they are cut in the fine lias of Tonnerre and are well preserved. It would be impossible to combine a lighter mass of stone, better undersized and more resistant with regard to its excess slenderness.

The side arches of the vault exactly circumscribe the great bases arches enter into grooves under those side arches, as indicated by the section X'. There is no need to say that the vertical mullions are in one piece each, and that the cusps are in [illegible] of stone. As [illegible] jointing arches of [illegible] in jointing arches of [illegible] in Fig. 6.

b B we form the equilateral triangle P b S. Then we have the base R S of the tracery resting on the mullions. Taking the points b S as centres and the length b S as radius, we trace the three lower pointed arches; we seek on that base R S the centres T of the second middle pointed arch starting from the imposts a and b and being tangent to the two circumferences M′ M″. All these lines form the axes X of the tracery, whose section we have given at Y. The darker portion Z on that section Y gives the section of the cusps. The axis p of these c cusps is at a certain distance from the axis X and must not be confused wit that. To trace the cusps we then take that distance inside the interiors of the circumference of the circles and of the lower pointed arches. For the cusps of the circles, m being the point marked on the axis at the distance X f given by the section of the tracery, one divides the distance m M into two equal parts; from the middle point m′ and taking m′m as radius, we trace the cusps with four circular lobes. As for the cusps of the lower pointed arches, they are traced with the same radius; the centres of the lower branches being placed on the base line R S. The cusps of the space Q are likewise inscribed within an equilateral triangle. At A A we have traced at the scale of 1 : 20 the detail of the cusps of the circle with the circular iron armature fixed to the f four ends of the lobes and destined to support the glass. The jointing of the tracery is indicated by lines g, etc. At B B is given the detail of the capitals. This tracery that is only 3.8 ins. thick by 9.0 ins. deep, suffices to maintain t the glass in the windows, that are 14.4 ft. wide by 30.2 ft. high from sill to crown, and they also rest on a perforated gallery (Art. Construction, Fig. 103): they are cut in the f fine lias of Tonnerre and are well preserved. It would be impossible to combine a lighter sash of stone, better understood and more resistant with regard to its extreme slenderness.

The side arches of the vault exactly circumscribe the great pointed arches that served as centres for turning them; for these arches enter into grooves under those side arches, as indicated by the section X′. There is no need to say that the vertical mullions are in one piece each, and that the openings are cut in very large slabs of stone, as indicated by the jointing traced in Fig. 6.

above the end of the 12 in century and the beginning of the [illegible]-
ma. One will note in the preceding example, that there are a still certain lines left for trial; thus the inscription of the upper circle, the generator of the cone there, in the Fig. F X I C, can be obtained in ellipse only by seeking on the axis F F the centre M by means of trials, the tangency of this circle with the lines G I and D H and the two arcs D F and GF only being known in advance by complex geometrical operations, that it would certainly be useless to make, the arcs being more than enough to seek geometrical methods, that could always be demonstrated, and consequently whose trace was absolute. That result is remarkable in the part of the centre of G. [illegible] the 14 in century. The equilateral triangle becomes in that a [illegible] that are [illegible], and that are [illegible] by a [illegible] tion according the tracery. The generating trace is made on those windows. The three vertical lines A A'A" pass through [illegible] based at C C'. on that base C C' is erected the equilateral [illegible] the two arcs C D and C'D, which are always the axes of the c [illegible] given at a on the section G. Dividing the lines C D a [illegible] points D C C'c being taken as centres, we trace the three arc- [illegible] the two points d d' divide the two arcs C c and c C' into two [illegible] to the distance between the generating arcs a and the axes b of the secondary windows of the tracery, whose section is at G. let this be e e', the generating of the tracery being fixed at the line I i; on that [illegible] the centre of the circular arc, that must pass through the points e and f: a c centre naturally obtained by drawing a line through the points e and f and erecting a perpendicular at the middle of that l line and as far as its intersection with the line of the level

About the end of the 13 th century and the beginning of the 14 th were employed methods still more precise and more rational. One will note in the preceding example, that there are s still certain lines left for trial; thus the inscribing of the upper circle, the generator of the other three, in the Fig. E K I L, can be obtained in practice only by seeking on the axis E F the centre M, by means of trials, the tangency of this circle with the lines G I and D H and the two arcs C E and DE only being known in advance by complex geometrical operations, that it would certainly be useless to make, the architects w were then brought to seek geometrical methods, that could always be demonstrated, and consequently whose trace was absolute. That result is remarkable in the part of the church of S. Nazaire of Carcassonne, which was erected at the beginning of the 14 th century. The equilateral triangle becomes in that e edifice the generator of all the compartments of the tracery. Let us take first the windows of the sanctuary of this church that are simplest, and that are divided only by a central mullion supporting the tracery. The generating trace is made on the axes of the little columns or rounds. Let (7) be one of those windows. The three vertical lines A A′A″ pass through the axes of the little columns, whose section is given at B. That axis is traced in a. The springings of the pointed arch being at C C′, on that base C C′ is erected the equilateral triangle C C′D, and taking C C′ as centre, there are traced the two arcs C D and C′D, which are always the axes of the r rounds given at a on the section B. Dividing the lines C D a and C′D into two equal parts, the dividing points d d′ and po points D C C′c being taken as centres, we trace the three curvilinear inscribed equilaterals. Two verticals dropped from the two points d d′ divide the two arcs C c and c C′ into two equal segments. Then taking inside these arcs distances equal to the distance between the generating arcs a and the axes b of the secondary members of the tracery, whose section is at B, let this be e e′, the springing of the tracery being fixed at the level E; on that springing we seek the centre of the circular arc, that must pass through the points a and f; a c centre naturally obtained by drawing a line through the points e and f and erecting a perpendicular at the middle of that l line and as far as its intersection with the line of the level

E. Hence the arcs C′D, C″d, c d′, d d′, etcs, are regarded as principal members, and the arcs c C″, e f, e′f as secondary members, the centres of the cusps G are taken on the axes passing through the summits of the curvilinear triangles, as indicated by the dotted radii; those cusps are secondary members, i.e., their section is that given by the second generating section whose axis is at b. But the arcs C c and c C′ being themselves secondary, the axes of the cusps are tangent to these arcs, as seen at g. As for the lower cusps h, they a are tertiary and take the section h′, a subdivision of the g generating section B. The capitals of the arches are placed on the level C C′.

The trace F of one half of the tracery at the scale of 1:25 explains the trace of that sketch so as to make understood the sections of all the members. Frequently as in the present case, the section of the extrados M is simplified and gives the section N, but that arrangement is rare; from the end of the 13 th century the sections are uniform at the intrados as at the extrados of the arches of the tracery. On the drawing is given the section of the side arch, that exactly encloses the arch of the tracery, serviug it then as centre. The tracery of these windows is in happy proportions; from the sill to the springings E of the lower arches the little columns are 25.3 ft high, and are composed of two or three pieces.

The compartments of the upper tracery generated by equilateral triangles lend themselves perfectly to the system of tracery arranged in three bays, quite generally adopted in the 14 th century. Since the windows were ornamented by stained glass, it was desired to have a middle motive; the windows in two or four bays were less favorable for the painting of subjects than the division into three. There was then an understanding between the architect and the glass painter. In the great same church of S. Nazaire the great eastern windows of the transept are indeed divided into three bays by means of two mullions; the compartments surmounting these mullions, although differing, all proceed by combenations given by the e equilateral triangle. Here is one of those windows (8).

It is understood that from the middle of the 13 th century the compartments are traced by taking the axes of the little columns or rounds. Then let a a′ be the axes of these little

little column whose section is given as A, with its secondary
itron into secondary and tertiary members; the line b being
the axis of the secondary member and B that of the tertiary
member. The separating of the side upon being at E, on the ba-
se line F F' is erected the equilateral triangle E E'C. The
points F F' are the centres of the principal arcs E C and E'C.
From the same point E' and the point D, taking F D as radius,
we describe the two arcs E'e and D e; from the point e as cen-
tre we describe the third arc D E', but reducing the radius
by the distance between the two axes A and b. It is clear ex-
act the centre e is found on the side E'C of the great equila-
teral triangle. Taking the points e and C as centres, we trace
the upper curvilinear triangle. From the point f of the inter-
section of the base with the axis of the window and always t
taking the distance e e' as radius, we obtain points of inter-
section g, that are the centres of the middle pointed arch fg.
These are the axes of the principal members of the construction,
[illegible]
the construction, which section is given on the secondary ar-
is b. Taking the points C and e as centres, and having divid
the arc C e into two equal parts, the lenetha e i and C i give
[illegible]
triangle inside the upper convex curvilinear triangle. Having
erected two verticals I I' a distance from the axes a
a' equal to the distance existing between the great axis A a
[illegible]
tance I I' as radius, we obtain the points c c', that are the
[illegible]
distance between the two axes A and b of the section, we trace
the middle trefoil, whose centres are at the angles of an co-
lateral triangle; then on the line of the level c c' prolon-
ged, we erect the lower central pointed arch [illegible] to the
lines of the trefoil. All these members belong to the secondar-
y section with axis at b. The cusps, the little trefoils and
the quadrilaterals traced in P belong to the tertiary section c.
At P is represented half the tracery with all its members, a
according to the thickness of each section, obtained by laying
[illegible]
At S is represented one of the capitals s of the mullions and
[illegible]

little columns whose section is given at A, with its decomposition into secondary and tertiary members, the line b being the axis of the secondary member and c that of the tertiary member. The springing of the side arch being at B, on the base line B B′ is erected the equilateral triangle B B′C. The points B B′ are the centres of the principal arcs B C and B′C. From the same point B′ and the point D, taking B D as radius, we describe the two arcs B′e and D e; from the point e as centre we describe the third arc D B′, but reducing the radius by the distance between the two axes A and b. It is clear that the centre e is found on the side B′C of the great equilateral triangle. Taking the points e and C as centres, we trace the upper curvilinear triangle. From the point f of the intersection of the base with the axis of the window aud always t taking the distance a a′ as radius, we obtain points of intersection g, that are the centres of the middle pointed arch fg. Those are the axes of the principal members of the compartment, those with the largest section A. It is now necessary to trace the compartments, whose section is given on the secondary axis b. Taking the points C and e as centres, and having divided the arc C e into two equal parts, the lengths e i and C i give us the radii of the three arcs forming the concave curvilinear triangle inside the upper convex curvilinear triangle. Having erected the two verticals l l′ a a distance from the axes a a′ equal to the distance existing between the great axis A and the secondary axis b, from the point n and taking the distance l l′ as radius, we obtain the points o o′, that are the centres of the lower arcs o n and O′ n. Always observing the distance between the two axes A and b of the section, we trace the middle trefoil, whose centres are at the angles of an equilateral triangle; then on the line of the level o o′ prolonged, we erect the lower central pointed arch tangent to the lobes of the trefoil. All these members belong to the secondary section with axis at b. The cusps, the little trefoils and the subdivisions traced in P belong to the tertiary section c. At R is represented half the tracery with all its members, a according to the thickness of each section, obtained by laying off to the right and left half the thickness of these sections. At S we represent one of the capitals s of the mullions and at T the pin through the iron bars placed at the springing of

the tracery, that are designed to maintain in their plane both the vertical columns and the compartments. These pins and all the joints of the stonework are cast in lead, a precaution becoming necessary from the time that the section of the mullions was reduced to a very small area. If one desires to devote some attention to the arrangement of that jointing, he will note t that the voids left at the middle of slabs of great dimensions are strengthened by subdivisions of trefoils and cusps, which add to the stability of this tracery. Those architects of the French Gothic school are terrible logicians, and the composition of the tracery of their great windows is a new proof of it.

Thus for example, those cusps H that are seen to appear about the middle of the 13 th century in Ile-de-France and at first at the S. Chapelle of Paris, those cusps regarded as a decoration and charm, were primitimely indicated by a need of strength. Every time that inconvenience results from a form adopted, one seeks and at once finds a means to remedy it, and that means becomes a motive of decoration. One sees in Fig. 8 that the branch K is isolated, and that the least settlement or an unequal pressure could break it at L; now that branch is strengthened by means of the cusp P forming an angle outside it. It is clear that the trefoils X, inscribed in the triangles opened in the largest pieces of the stone, give great strength to the branches of these triangles. Likewise the cusps M of the branches of the upper curvilinear triangles and those at N of the three right angle projections singularly add to t the resistance of these parts of the stonework. One does nothing different today, when he gives greater strength to cast iron members, for example, without sensibly increasing their weight; but it is true that it is desired to regard those innovations as due to modern science.

While rendering all justice to our time, we may however be permitted to restore to each epoch what belongs to it in fact; one is indeed compelled, when he desires to study with attention the composition of these stone traceries, occupying considerable areas relatively to those given by preceding and modern methods of architecture, are traced, combined and j jointed in a manner to present the least voids and to offer the greatest resistance possible. By drawing the principal members and the sections of the joints, all the weights are tran-

means of those territory surfaces, such as terrain and sea-
ds. These con ruscions must have been good, since most of our
great iconic stirrons have retained their tracery, and when
they have suffered deterioration, it is easy to restore or r
replace them, that as one replaces the iron or wooden seat. T
The stone tracery even has this advantage, that it can be re-
paired in part, if there are some breaks, while the sash of
wood or iron, once deformed, must be renewed.

And the iron armature destined to attach it. Only considering
from production, they appear to us to form masses of agreeable
appearance, restaurine the eye and nobly composed. Into Ile-
de-France it is always necessary to go to seek the best exam-
ples of this architecture, at the moment when it develops, to
most classical art of the middle ages, a sobriety and an ar-
ticulation of correct principles, obtained by the aid of the
simplest method, a refinement in proportions, in the choice
of profiles, that leave in the second rank the works of the
other provinces.[1] To give (2) one of the windows of the chan-
nels of the choir of Notre Dame of Paris, erected at the sec
time as the choir of the canton 5. Vessire of Barcassonne, i.
e., about 1320.

*Note 1.p.227. It should not be forgotten that the construc-
tion of the choir of church 5. Nesvire of Carcassonne is due
to an architect of the royal domain.*

Here is seen the essence of all complex combination, it is
always the design of the tracery of the windows of the S. Co-
mmella of Paris, but made lighter. These windows are also di-
vided in four bays by means of a central mullion, whose sect-
ion is given by the axis A, and two secondary mullions, whose
section is derived from the principal and as given by the axis
b. Let a and a' be the axes of the principal section A. From
the point B, taking a'a" as radius, is described the arc con-
centric with the arcs C E. Then B C is the side of an e
quilateral triangle. From the same point E and from the point
T at the middle of the base of the triangle, taking E L as r

transferred on the vertical mullions, but chiefly to the jambs; as for the open panels, they are made rigid as solid slabs by means of those tertiary stiffenings, such as trefoils and cusps. These com inations must have been good, since most of our great Gothic edifices have retained their tracery, and when they have suffered deterioration, it is easy to restore or r replace them, just as one replaces the iron or wooden sash. T The stone tracery even has this advantage, that it can be repaired in part, if there are some breaks, while the sash of wood or iron, once deformed, must be renewed.

Let us add that this stone tracery glass of enormous weight and the iron armature destined to attach it. Only considering those architectural members from the point of view of the effect produced, they appear to us to form designs of agreeable appearance, reassuring the eye and happily composed. Into Ile-de-France it is always necessary to go to seek the best examples of this architecture, at the moment when it develops, to arrive at formulas. One finds iu that school the purest aud most classical art of the middle ages, a sobriety and an application of correct principles, obtained by the aid of the simplest methods, a refinement in proportions, in the choice of profiles, that leave in the second rank the works of the other provinces.[1] We give (9) one of the windows of the chapels of the choir of Notre Dame of Paris, erected at the same time as the choir of the church S. Nazaire of Carcassonne, i. e., about 1320.

Note 1.p.337. It should not be forgotten that the construction of the choir of church S. Nazaire of Carcassonne is due to an architect of the royal domain.

Here is seen the absence of all complex combination; it is always the design of the tracery of the windows of the S. Chapelle of Paris, but made lighter. These windows are also divided in four bays by means of a central mullion, whose section is given by the axis A, and two secondary mullions, whose section is derived from the principal and as given by the axis b. Let a and a′ be the axes of the principal section A. From the point B, taking a′a″ as radius, is described the arc concentric with the side arch C B. Then B C is the side of an e equilateral triangle. From the same point B and from the point I at the middle of the base of the triangle, taking B L as r

radius, we trace the arcs B E. Now I E is equal to E C. The
upper circle is traced tangent to the arcs B C and I F. These
are the arcs of the principal members, those with section di-
vided by the profile whose axis is A. Leaving off joining the wid-
dow and from the points a a' a distance equal to the distance
between the axes A and b to e e', dividing the base line e e'
into two equal parts, taking e f as radius, we trace the low-
er arches e f d, f e'd', then the under secondary arch concen-
tric with the outlined arch I E F. Taking toward the interior
of this circle and of the lower arches a distance equal to the
distance between the axis b of the secondary section and the
axis c of the tertiary section, we trace the axes of the cusps.

The drawing of this tracery is then easily made, the combi-
nation is happy and clear, stable and with solid jointing, as
one can see at G. At K is given the section of the jamb b sec-
[illegible]
volt. At L is given the profile of the wall with outside at I
[illegible]
isometrical projection of the abscesses of the cuspids, and then
at M is the orthogonal projection of the bases. Here the fron-
tion of the cusps is evident. These cusps i give great stabi-
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
crown inside.

Once the logical principle is admitted in the construction
of the tracery as in the other members of Gothic architecture,
[illegible] did not stop. Soon they entirely [illegible]
[illegible] sections, secondary and tertiary; they adopted a sin-
gle section for all members of the tracery, except the cusps
[illegible] are thinner. About the end of the 14 th century men sim-
[illegible] even seek to avoid pointed arches. The tracery is compo-
sed only of curves and reverse curves, so as to no longer face
[illegible]
[illegible]
[illegible]
[illegible]
[illegible] a number of examples, we shall study the tracery a

radius, we trace the arcs B E. Now B E is equal to E C. The upper circle is traced tangent to the arcs B C and I E. These are the axes of the principal members, those with section given by the profile whose axis is A. Laying off inside the window and from the points a a′ a distance equal to the distance between the axes A and b to e e′, dividing the base line e e′ into two equal parts, taking e f as radius, we trace the lower arches e f g, f e′g′, then the under secondary arch concentric with the pointed arch I B F. Taking toward the interior of this circle and of the lower arches a distance equal to the distance between the axis b of the secondary section and the axis c of the tertiary section, we trace the axes of the cusps.

The drawing of this tracery is then easily made, the composition is happy and clear, stable and with solid jointing, as one can see at G. At K is given the section of the jamb h supporting the side arch of the vault forming the external archivolt. At L is given the profile of the sill with outside at l with the penetration of the bases. The sketch m gives the horizontal projection of the abacuses of the capitals, and that at n is the horizontal projection of the bases. Here the function of the cusps is evident. These cusps i give great additional strength to the principal and secondary branches of the arches, and one sees how they are skilfully arranged not to interfere with the cuts a the joints. The central and the two secondary mullions are each of a single piece; as for the upper tracery, it is composed of only 15 pieces, and still these windows are 13.1 ft. wide by about 14.8 ft. high below the c crown inside.

Once the logical principle is admitted in the construction of the tracery as in the other members of Gothic architecture, architects did not stop. Soon they entirely renounced the generating sections, secondary and tertiary: they adopted a single section for all members of the tracery, except the cusps that are thinner. About the end of the 14 th century men already even seek to avoid pointed arches. The tracery is composed only of curves and reverse curves, so as to no longer form a network of uniform resistance. That was logical in theory; in practice those forms were less satisfactory.

To not charge this Article, already quite extended, with t too great a number of examples, we shall study the tracery a

chosen in the 15 th century, and in the compositions we
one perceives that tendency of the constructors of this epoch
to [illegible] the style of the apparent symmetry.

Then in the composition of tracery, architects seek to trans-
form all forces and loads into vertical pressures. Let (12) be
one of those windows of the 15 th century.[1] The section of t
the three mullions of those windows is the same (see detail A).
It is likewise reproduced in the tracery: the cusps alone are
thinner and take the section c. By means of the great reverse
curves of all the vertical divisions, the loads are transmitted
to the central mullion 3 and the jambs D. A part of these lo-
ads is even thrown on the intermediate mullions 4 by the reve-
rse curves 2 and by those of c. The combinations of these cur-
ves and reverse curves show well the art of the construction
proposed to attain, viz:- tracery formed a network where me-
ans are received into vertical pressures, a general system of
stiffening and reinforcement in all work points by the cusps.
For example, one understands that the curve o would break un-
[illegible]

[1] The [illegible] is [illegible] the [illegible]
[illegible] by [illegible] or last [illegible] in the [illegible]
the stone tracery.

Note 1.p.289. That given here comes from the choir of the c
church of Ru, in which the architecture of the middle of the
15 th century is pure and widely understood.

[illegible] will recommend that all the weak points, that must suffer the
atmospheric pressures are stayed or stiffened by curves that t
tend to make all the measure elastic; that these curves are t
traced by reason of the variable direction of the pressures,
so as to decompose those that are oblique, and change them to
loads acting vertically; that the joints of the stonework are
not perpendicular to the direction of those pressures, so as
to avoid weak joints subject to slip or to cause breaks. We
do not have a very strong taste for this kind of architecture.
But it is impossible for us not to recognize there the work
of very experienced and serious constructors, even logical
to excess, among whom caprice or chance has not taken rom.
When the abuse of a principle leads to such conceptions, it

adopted in the 15 th century, and in the composition of which one perceives that tendency of the constructors of that epoch to further only take account of logic, often at the cost of t the style of the apparent simplicity.

Then in the composition of tracery, architects seek to transform all forces and loads into vertical pressures. Let (10) be one of those windows of the 15 th century.[1] The section of t the three mullions of those windows is the same (see detail A), it is likewise reproduced in the tracery; the cusps alone are thinner and take the section B. By means of the great reverse curves of the two principal divisions, the loads are brought to the central mullion C and the jambs D. A part of these loads is even thrown on the intermediate mullions E by the reverse curves a and by those at b. The combinations of these curves and reverse curves show well the aim that the constructor proposed to attain, viz:- tracery forming a network whose meshes are resolved into vertical pressures, a general system of stiffening and reinforcement at all weak points by the cusps. For example, one understands that the curve c would break under the least pressure, if it were not strengthened by the c cust d. The bars e destined to maintain the panels of glass a also come to add strength to that given by the combination of the stone tracery.

Note 1.p.339. That given here comes from the choir of the c church of Eu, in which the architecture of the middle of the 15 th century is pure and wisely understood.

If one is willing to examine this tracery with attention, he will recognize that all the weak points, that must suffer the strongest pressures are stayed or stiffened by curves that t tend to make all the members stable; that these curves are t traced by reason of the variable direction of the pressures, so as to decompose those that are oblique, and change them to loads acting vertically; that the joints of the stonework are cut perpendicular to the direction of those pressures, so as to avoid weak joints subject to slip or to cause breaks. We do not have a very strong taste for this kind of architecture, but it is impossible for us not to recognize there the work of very experienced and sagacious constructors, even logical to excess, among whom caprice or chance has not taken root. When the abuse of a principle leads to such conceptions, it

[illegible] necessary to declare the above, but it is essential to em-
[illegible]
[illegible]
[illegible]
by their reason. It does not certain to be today to wear a
[illegible]
and do not know why so are them, who exhibit insufficiency,
when it concerns this sort of architecture. In this last exam-
ple, the vertical mullions are each of a single piece from the
sill to the springings of the curves. The bar 2 passes through
[illegible]
masonry by means of bent pins 2/3 or 2/4 inch. Since maintain-
ing the glass panels engaged the grooves I. The bars and rods
are well as the dividing bars e have sleeves and keys. The ar-
chitects of the 17 th century tended so much to combinations
of their tracery, that they often cut it in semi-circ arcs.
For example from the royal layer. It is also necessary to ob-
ve, that they have that a section relatively greater than the
[illegible]
more delicate. These compartments of the tracery were retain-
ed until about the middle of the 16 th century. Yet at the a
season of the Renaissance some attempts were made to place the
tracery in harmony with the new architectural forms in vogue
[illegible]
Parce-Pompeii, which presents the most singular mixture of t
the traditions of the middle ages and the reminiscences of a
Roman antiquity. One might believe that he was obsessed
as it Pompeii expected in ruins.

*Note 1.p.641. From the 15 th century the constructors that
not occasion to find the tracery fine enough by ornamentation,
[illegible] to the elsewhere by making it sight, replac-
ing these metal pins by pins of mutton bones or of stephers.
The latter have restored all their hardness.*

Here (11) is one of these combinations. The window is divid-
ed by two vertical mullions G, its axis being at V. The some
designer here has not sought wise joints for assembling the
masonry. Thus actually consists only of three perforated and
stereotomed lineels, whose beds are seen at L L' L", the cross-
ing O of the each forming parts of these lineels. The also r
considerings that the assembled by the arrangement of the cross-

is necessary tn deplore the abuse, but it is essential to equitably state the value of the principle, and to attempt to d derive benefit by avoiding that excess. These men knew thoroughly the resources of their art, doing nothing unless guided by their reason. It does not pertain to us today to cast a stone at them, we that possess varied and excellent materials, and do not know how to use them, who exhibit insufficiency, when it concerns this sort of architecture. In this last example, the vertical mullions are each of a single piece from the sill to the springings of the curves. The bar G passes through the heads of these mullions and maintains the imposts of the tracery by means of bone pins 3/8 or 3/4 iuch. Wires maintaining the glass panels entered the grooves I. The bars and rods as well as the dividing bars e have staples and keys. The architects of the 15 th century trusted so much to combinations of their tracery, that they often cut it in semi-hard stone, for example from the royal layer. It is also necessary to state, that they gave that a section relatively greater than that adopted for the tracery of the 14 th century, which is always more delicate. Those compartments of the tracery were retained until about the middle of the 16 th century. Yet at the e epoch of the Renaissance some attempts were made to place the tracery in harmony with the new architectural forms in vogue at that epoch. Witness certain tracery of the churlh of La Ferte-Bernard, which presents the most singular mixture of t the traditions of the middle ages and the reminiscences of Ro Roman antiquity. One would believe that he sees the arabesques of Pompeii executed in stone.

Note 1.p.341. From the 15 th century the constructors that had occasion to find how those iron pins swelled by oxidation, and were injurious to the stonework by making it split, replaced these metal pins by pins of mutton bones or of stagborn. The latter have retained all their hardness.

Here (11) is one of these combinations. The window is divided by two vertical mullions G, its axis being at M. The stone designer here has not sought wise joints for assembling the tracery. That actually consists only of three perforated and superposed lintels, whose beds are seen at L L′ L″, the branches O of the arch forming parts of these lintels. One also r recognizes that the architect by the arrangement of the arab-

arabesques wished to give strength to the weak points of the openings. The little figures and the scrolls only exist outside the glass, the glass panels being inserted in the principal compartments. Even the little column K has only half the thickness of the tracery and exists only on the exterior. At A is traced the section on a b and at B is the section on c d. The most delicate portion of that tracery is scarcely more t than an external decoration, that nowise supports the glass panels, but which still gives a little more stability to the work. This tracery produces a very good effect and is executed with delicacy and remarkable perfection. The rampant soffits under the cornices of the pediments are ornamented by d delicate engraving. The system of lintels or of perforated c courses adopted here could only be suited to quite narrow windows, since it forbids vertical joints. In the same church t the tracery of the windows having three mullions and four bays are combined in the mode of those before given, Fig. 10.

The windows of civil architecture also have mullions, when they were too wide for it to be possible to close them with a single sash (Art. Fenetre, Figs. 29, 31, 32, 33 35, 36, 37, 38, 40, 41, 42). Until the end of the 13 th century, these m mullions habitually consisted only of a little column relieving the lintel. The architects displayed a certain luxury of sculpture in the tracery of palaces, and sometimes even ornamented their shafts by figures. We have discovered at Sens a very beautiful mullion of this kind, which dates from the 12 th century (12).[1] The statuette attached to the column with octagonal section forming the body of the mullion represents geometry or architecture; it holds the great compasses of a detailer. At A is traced the section of the mullion made on a b, at B is the side of the mullion with the projection at the back intended to receive the bolts. In the section A we have not indicated the section of the figure by hatching, in order to show that of the little column in whose shaft was e engaged the statue. On the lower part of the mullions of the upper windows of the cathedral of Nevers, on the exterior one also notes statues attached to the shafts of the little central columns.

Note 1.p.348. This little column, which serves as a window mullion, is now placed in one of the windows of the ground s

story of the hell of the space of 3ere.

At the season of the Renaissance, we also see millions in the form of carvatrices, or of atlasses surrounded by birds. It was scarcely until the reign of Louis XIV, that tracery was definitely renounced; new skill employed it at the beginning of the 17 to century to multiply the glories of minor decorative. The internal niches of the court of the Louvre are certainly filled with some millions of monumental spaces, which save the name of larger to those great openings. Those millions are now replaced by modern morning with trophies also of wood, that are scarcely in harmony with the style, which it is made easy to repeat every ten years, and to renew when they decay, i.e., two or three times in a century. Which say that is more according to the rules of good architecture: why? We would be much embarrassed to say why.

[illegible]

If the peoples of the South are occasionally not in making works in carpentry, they are no less skilful in giving to wood those form both delicate, light and stable, that constitute tinery. The art of joinery is further only a branch, derived from the art of the cabinetmaker in the finest centuries of the middle ages; the means of execution are the same.

The art of joinery is clearly distinguished from the art of carpentry, when its commence to employ for sawing, cutting and polishing wood very perfect tools. The invention of the saw dates back to a date antiquity; the ancients knew the blade, the sport and the long jointer. Still until in the 12 to century were often employed for joinery given wooden by the chisel and the tools without the aid of the plane.

There remain to us only a very small number of objects in joinery conducted the 12 to century, and in the assemblage those fragments was economic carpentry works executed at a small scale. Put from the 13 to century the art of joinery takes a great flight, consecrate its special rules, and arrives as at a remarkable degree of perfection. The works in joinery that remain to us from the 14 to and 15 to centuries are often masterpieces in construction, execution and drawing. The beautiful of this art reached until the 17 to century really from - 1. a perfect knowledge of wood: 2. from a sagacious o

story of the hall of the synod of Sens.

At the epoch of the Renaissance, one also sees mullions in the form of caryatides, or of pilasters surrounded by busts. It was scarcely until the reign of Louis XIV, that tracery was definitely renounced; men still employed it at the beginning of the 17 th century to maintain the closures of window openings. The internal windows of the court of the Louvre were originally fillet with stone mullions of monumental appearance, which gave the name of ladder to those great openings. Those mullions are now replaced by wooden muntins with imposts also of wood, that are scarcely in harmony wit the edifice, which it is nece sary to repaint every ten years, and to renew when they dacay, i.e., two or three times in a century. Men say that this is more according to the rules of good architecture; why? We should be much embarrassed to say why.

MENUISERIE. Joinery. Woodwork. Cabinet Work.

If the peoples of the North are particularly apt in making works in carpentry, they are no less skilful in giving to wood those forms both delicate, light and stable, that constitute joinery. The art of joinery is further only a branch, derived from the art of the carpenters in the first centuries of the middle ages; the means of execution are the same.

The art of joinery is clearly distinguished from the art of carpentry, when one commences to employ for sawing, cutting and polishing wood very perfect tools. The invention of the saw dates back to a high antiquity; the ancients knex the plane, the short and the long jointer. Still until in the 13 th century were often employed for joinery riven woods, wrought by the chisel and the gouge without the aid of the plane.

There remain to us only a very small number of objects in joinery preceding the 13 th century, and in the assemblage of those fragments muc resemble carpentry works executed at a small scale. But from the 13 th century the art of joinery ta takes a great flight, possesses its special rules, and arrives at a remarkable degree of perfection. The works in joinery that remain to us from the 14 th and 15 th centuries are often masterpieces in combination, execution and drawing. The traditions of this art retained until the 17 th century result from:- 1, a perfect knowledge of wood; 2, from a sagacious p

In the very early of construction, the material employed in joinery must determine the procedures of assembling and i trosse the forms; now wood is a material cosse sing sosnial properties, that must be taken into account in the combination of works in joinery, just as in the combination of works in carpentry; the artizans of the middle ages did not wander from this true principle. The knowledge of woods is one of t his conditions imposed on the joiner; that knowledge being acquired, it is necessary to know how to employ them according to their texture and structure. The wood that best lends itself to works in joinery is oak, because of its rigidity, the fineness of its grain, its uniform hardness, its durability and its ability to hold glue as well as lower in price, oak was exclusively employed in the joinery of ourlinges.

To be employed in joinery, oak must be perfectly dry, i.e. must have been sawn at least six years. If we examine joinery works of the 13 th, 14 th and 15 th centuries, we shall indeed observe, that the wood has not warped, that it has remained in its connections, and that it presents no cracks. This most after sawing was at first left in same places and even in water, then piled in open sheds under dry shelters, frequently turned and sometimes subjected to the action of smoke.

Note 1.p.216. Thus was prepared the wood, that served for making the stalls of the cathedral of Lucca. This wood has conserved the appearance of Florentine brown.

The joiners of the middle ages did not use too old wood, it was subject to crack and rock. They seemed to be very oaks of 200 to 300 years, i.e., trunks with a diameter of 2.3 ft. above ground that varied from 2.7 to 3.3 ft. Large the sacrificed. These trunks were sawn according to different methods, but always taking into account as much as possible the texture of the wood. A trick of oak that cross crackes according to sawing - (O), which is easy to explain. The concentric layers are harder and more compact as they approach the centre.

Layers contain more water as they have a greater radius. Then the wood dries, the external layers shrink more than the inner ones; these result splits or cracks, all radiating from the

principle of derign; 3, from a judicious use of the material in accordance with its special properties.

As in every system of construction, the mateeial employed in joinery must determine the procedures of assembling and i impose the forms; now wood is a material posse sing special properties, that must be taken into account in the combination of works in joinery, just as in the combination of works in carpentry; the artizans of the middle ages did not wander from this true principle. The knowledge of woods is one of t the conditions imposed on the joiner; that knowledge being acquired, it is necessary to know how to employ them according to their texture and strength. The wood that best lends itself to works in joinery is oak, because of its rigidity, the fineness of its grain, its uniform hardness, its durability and its beauty. So during the middle ages at least in France, oak was exclusively employed in the joinery of buildings.

To be employed in joinery, oak must be perfectly dry, i.e. must have been sawn at least six years. If we examine joinery works of the 13 th, 14 th and 15 th centuries, we shall indeed observe, that the wood has not sprung, that it has remained in its connections, and tha it presents no cracks. This wood after sawing was at first left in damp places and even in water, then piled in open sheds under dry shelters, frequently turned and sometimes subjected to the action of smoke.[1]

Note 1.p.346. Thus was prepared the wood, that served for making the stalls of the cathedral of Auch. This wood has acquired the appearance of Florentine bronze.

The joiners of the middle ages did not use too old wood, t that is subject to crack and spot. They caused to be sawn oaks of 200 to 300 years, i.e., trunks with a diameter at 9.8 ft. above ground that varied from 2.3 to 3.3 ft. inside the sapwood. These trunks were sawn according to different methods, but always taking into account as much as possible the texture of the wood. A trunk of oak that dries cracks according to sketch - (O), which is easy to explain. The concentric layers are harder and more compact as they approach the centre, more porous as they approach the circumference. Thus these layers contain more water as they have a greater radius. When the wood dries, the external layers shrink more than the inner ones; there result splits or cracks, all radiating from the

heart of the trunk. If the wood is sawn without regard to this effect of drying, the sawn planks crack or buckle; they a are sensible to all variations of temperature. On the contrary if this sawing be done in the natural direction of the cracks, the planks shrink in width, but can neither split nor buckle, i.e., curve in the direction of the sawing. Oak is f formed of a series of layers like all woods, but these layers are connected by a kind of natural dowels, that make it solid; these dowels are termed medullary rays and radiate from the centre of the trunk. If then the sawing be done as indicated in the quarter B of the drawing, it is done in the best conditions, it is what is termed quarter-sawn (parallel to the medullary rays). This mode of sawing is lengthy and loses many triangular strips that are merely laths. The best mode of sawing after this is indicated on the quarter D, then that sketched on the quarter E. As for joists and timbers, the most ec economical sawing is that sketched on F. The meduallary rays of oak not only give stiffness to planks sawn radially, but also present surfaces with a silky and watered appearance, t that adds much to the beauty of the wood. Quarter-sawn oak is then best for joinery.[1]

Note 1.p.347. A quality that we now call Holland oak, and that is still in great part furnished by Champagne. Indeed m much wood for joinery that comes to us from Holland is purchased by Dutch merchants in the forests above Rheims. The mode of sawing our woods makes us dependent on the Dutch. In fact the Dutch saw wood radially, i.e., they make the saw-cuts as much as possible always tending toward the centre of the tree, as practised in the middle ages and as still done by the rivers of stakes (On that subject see Traite de l'evoluation de la menuiserie, by A Boileau and F Bellot. Paris. 1847. p.48 et seq.; also Hassenfratz, Theorie des bois. Paris. 1804.p.133).

Although joiners employed skin glue and cheese glue, yet the solidity of the work first of all depended on the arrangement of connections by dovetails or dowels.

To join boards men used only quite late (about the 15 th c century) rebates or tongues. They were connected by dovetails let into the wood (1), as seen at A; by strips halved and pinned as at B; by dovetail bars entirely sunk, or by tenons D of hard wood or even of iron. These are elementary combinations

that have been employed in all times. Tonsi works in wood f
[illegible] [illegible] [illegible] [illegible]
ebony of the bounds to placed a coat of onness glue then sara-
sa the bounds or prunka to ainare bosenar. By means of a po-
lished surface the visible surface is polished and burnsi, or
ornamenta or figures are inlaid to a silent depth. According
to these processes we made the pine house of the ancestral
c' Tay-ko-Tsing, that date from the 11 to century. These con-
tempt are silently carved in relief and themselves as well a
as the grounds are covered by paintings on a tissue of lead o
xoris (minium).[1]

*Note 1.p.242. Much of the old joinery retains traces of a coating with red lead, and that coating has contributed sinki-
lorly to their preservation. This process was revived a dozen years since by us and gives excellent results. It is generally adopted today. (See in regard to the joinery and polishing of woods the work of the monk Theophilus. Theosorum artium sch-
ritis, lib. II, Diversis 11).*

[illegible] [illegible] [illegible] [illegible]
for example in that pagoda there were born the nation of
[illegible], [illegible] [illegible] [illegible] [illegible]
(mirio and ratis) at each 9.0 lrs. for ordinary works.---
The greatest possible strength is left to the wood at the jo-
ints. In that chapter, mortices and mortises stop where
a joint is necessary. The observation of these two constrio-
ns gives a particular character to the joinery. If the mater-
ial be economized, if it be employed in accordance with its
properties, the workmanship is lavished, as if to emphasize
the precious properties of the wood; for it should not be for-
gotten that during the middle ages the workmanship is always
according to the value of the material; it is superior to that
out in a relative proportion.

[illegible] [illegible] [illegible] [illegible]
of the wood. Just as the stonecutters took into account the
[illegible] [illegible] [illegible] [illegible]
and a feeling of economy that increase attention and early ri-

that have been employed in all times. Indeed works in wood f frog Egyptian antiquity are made by these procedures. On the edges of the boards is placed a coat of cheese glue that causes the boards or planks to adhere together. By means of a rounded scraper the visible surface is polished and painted, or ornaments or figures are inlaid to a slight depth. According to these processes ar made the pine doors of the cathedral of Puy-en-Velay, that date from the 11 th century. These ornaments are slightly carved in relief and themselves as well a as the grounds are covered by paintings on a trace of lead o oxide (minium).[1]

Note 1.p.348. much of the old joinery retains traces of a coating with red lead, and that coating has contributed singularly to their preservation. This process was renewed a dozen years since by us and gives excellent results. It is generally adopted today. (See in regard to the joinery and polishing of boards the work of the monk Theophilus. Diversarum artium schedula. Book I. Chapter 17).

Two principal conditions seem to have been imposed on the works of joinery of the middle ages; economy of material and the greatest possible strength left to the wood at the joints. -- Economy of the material in that reinforcements are avoided when they could not be included within the squared timber; f for example in that panels never have more than the width of a board, i.e., at most 8.7 ins.; the muntins and cross-bars (stiles and rails) at most 3.2 ins. for ordinary works.--- The greatest possible strength is left to the wood at the joints, in that chamfers, reductions and mouldings stop where a joint is necessary. The observation of these two conditions gives a particular character to the joinery. If the material be economized, if it be employed in accordance with its properties, the workmanship is lavished, as if to emphasize the precious properties of the wood: for it should not be forgotten that during the middle ages the workmanship is always according to the value of the material; it is superior to that but is in a relative proportion.

The joiners of the middle ages took into account the value of the wood, just as the stonecutters took into account the value of the stone. There is a just idea, the true principle and a feeling of economy that imposes attention and study wi-

without injury to the art, for it is art. Those artizans thought that a material so precious as wood, that grows slowly a and requires long preparation to be definitely placed in the work, merits that it should not be wasted , and that the idea of its value is given by the care with which it is wrought. Those artizans did not give to joinery of pine, larch or fir, the forms permitted by the use of oak or walnut. Observing t the special qualities of the different species, they held to lightness combined with solidity, which is the first law of joinery, as we have already stated. consequentlw it would have never occurred to them in thought to imitate in joinery t the forms proper for stone; they never applied to joinery great curves that require considerable loss and require wood to be cut across the grain. All their combinations are based on the straight line, at least for the members. The study of this art, so greatly out of its path tsday, is then interesting; for with a system of construction very restricted, dimensions comprised in those of the wood uniformly sawn, those artizans succeeded in inventing the most varied and most ingenious combinations without ever being stopped by the difficulties presented by those combinations.

It is necessary for us to classify the works of joinery by kinds, so as to place order in this Article. We shall commence with those simplest in principle, with grilles, i.e., assemblages of pieces of wood of equal sizes, forming open closures in a single plane, in brief, grilles.

CLOTURES; CLAIRE-VOIES; CLOTETS; LAMBRIS.

Grilles, Sashes, Panels, Wainscot, Doors.

Here (2) is one of those wooden grilles as seen in the cathedral of Basle and in some churches of the provinces of the East. From a simple lattice of timbers halved together the j joiner came to make a grille of monumental appearance. The p principle stated above, that consists in leaving the wood all its strength at the joints is scrupulously observed; but between those joints at the openings the workman has used chamfers that form a decoration and take from that so simple a combination the rude appearance, that it would have if the pieces had remained square.[1]

Note 1.p.350. This grille retains forms belonging to the Romanesque epoch, although we do not believe it to have been made

before the 14 th century.

Here also (3) is an example of a framework forming a solid wainscot. The muntins and rails are the same aud halved together, chamfered between the join s. The square openings left in the framework are filled by small panels simply set in the rebates like panels in a frame. (See section A).[2]

Note 2.p.350. From the city hall ot Ghent.(15 th century).

This sort of wooden grille was much used in the middle ages in castles and houses; frequently the great halls were divided by grilles of this kind, movable and that were placed when it was desired to obtein temporary divisions. In winter tapestries were suspended on these grilles; in summer they remained open. These movable divisions termed "clotets" were often very richly ornamented, having open panels and formed interlacings, the members ingeniously assembled, always by halving. For do not forget that the dominant character in French joinery of the middle ages is to be assembled, to retain a logical structure in perfect accordance with the form. There exist in Italy, Spain and even in the Orient joinery works of charming appearance, that attract by their excessive richness aud complex combination; but when one attentively examines the construction of those works, he soon perceives that this structure nowise accords with the appearance. The lightness is only external, the construction i.s of the rudest; for example, such is that seeu in the Arab joinery of Spain, in a facing of mouldings mitered and nailed on a ground of boards placed beside each other rather than a sembled. such are the carved works glued on and applied on each other in a charming design, b but that decoration not according at all with true construction; and as one can observe in certain cabinet works of Italy and even in Germany of the middle ages, there are actual logs of wood connected by dowels, across which run mouldings, reliefs and ornaments, cut in the solid wood, just as in a block of marble. The mouldings are cut across the grain, the joints fall in the middle of a relief, no matter. Between the use of the material and the mode of ornamenting is no harmony or connection; the joiner and the artist are two men that work separately after each other. The joiner is merely an assembler of blocks; the artist is only a sculptor caring nothing for the nature of the material supplied to him. certainly those works

can be very beneficial from the point of view of the art of [illegible]. It is necessary for us to analyze this and to claim those qualities so truly French? Why are they accepted and fashionable? Those works in wood of the Arabs and orientals have at least preserved the traditional item of musical joinery, and if the artisans do not understand them, and do indeed know not a single one consequently, at least they remember the acquaintance: our age cannot say as much of Italian joinery, nor of that made in France since the 17 th century in imitation, and concerning so our principally logical society.[1]

Note 1.p.292. We have frequently been called to remove joinery of the 17 th and 18 th centuries. One cannot understand how sculpture, often so delicate, and charming ornamentation, could be allied to construction so crude and unreasonable. I the beautiful stucco of Notre Dame of Paris, that date from the beginning of the last century (18 th), are an example of that combination of heterogenous means masked under the richest appearance.

Fig (4) is one of those details of far even as one still meets in the [illegible] of the 14 th century. The system consists of mouldings of the chisel 1. 4 is. square. On the moulds 4 are naiver the pieces 4. On trace the pieces 3. 3 has 4; on those last the moulds, all being naived. The entire work is estimated in the figure 2 2 I made of pieces 3.2 [illegible] 3.1 [illegible] SAVAT [illegible] iron bra K wiad ewe wasseeg jur ryvtes. On the front of each hexagon the corners are ornamented as indicated by the detail 1, and [illegible] 1, [illegible] also novered to fort asere wiad sax points, composed of two interconnecting semicircles triangles. One sees here that if the principle is simple and the material is common, the workmanship demands a certain importance. As I we have given a section of the details made on a 6, and at 2 is a perspective detail of the portion 3 taken apart. It is unnecessary to emphasize the solidity and perfect practicity of this light joinery, whose effect is very brilliant. This sort of joinery works were usually always painted in light colors enhanced by brown or black lines. Thus in the example given here the grounds being white,

can be very beautiful from the point of view of the art of the sculptor, bu one cannot regard them as joinery. Why is it necessary for us to explain thus and to claim those qualities so truly French? Why are they scorned and forgotten? Those w works in wood of the Arabs and orientals have at least retained the traditional form of actual joineey, and if the artizans do not understand them, and no longer know how to apply t the construction, at least they respect the appearance; but one cannot say as much of Italian joinery, nor of that made in France since the 17 th century in imitation, and contrary to our eminently logical spirit.[1]

Note 1.p.352. We have frequently been called to remove joinery of the 17 th and 18 th centuries. One cannot understand how sculpture, often so delicate, and charming ornamentation, could be allied to construction so crude and unreasonable. T The beautiful stalls of Notre Dame of Paris, that date from the beginning of the last century (18 th), are an example of that combination of barbarous means masked under the richest appearance.

Here (4) is one of those grilles of fir such as one still sees in the provinces of the East and on the vignettes of m manuscripts or paintings of the 15 th century.[2] The system consists of tringles of fir pieces 1.6 ins. square. On the muntins A are halved the pieces B. On these the pieces C, D and E; on these last the muntins, all being halved. The entire work is maintained in the frame G H I made of pieces 3.2 ins. thick by 3.7 ins. wide. At each halved joint is a soft iron bin K with two washers and riveted. On the front of each hexagon the corners are chamfered as indicated by the detail L, and in the open triangles M, the edges of the triangles are also notched to form stars with six points, composed of two intersecting equilateral triangles. One sees here that if the principle is simple and the material is common, the workmanship assumes a certain importance. At N we have given a section of the grille made on a b, and at P is a perspective detail of the portion O taken apart. It is unnecessary to emphasize the solidity and perfect rigidity of this light lattice, whose effect is very brilliant. This sort of joinery works were nearly always painted in light colors enhanced by brown or black lines. Thus in the example given here the grounds being white,

the counter of the horses are reddish brown, as well as the [illegible] a thin black line. The mangers and iron rivets were also painted black.

Note 2.p.352. This is here given was drawn by me at Luxeil.

We could multiply these examples, but perhaps of one type will appreciate the extra trouble to be derived from cross comparisons without the being necessary to emphasize it.

In France history of art 14 to century are certain works whose indent have very resemblances to the works of the primitives mentioned above, but whose structure however is more complex. [illegible] formed of joiner boards, fastened in a frame, to prevent the boards from bending and splitting as much as to accelerate the close surfaces, at least on one side. The joiner placed between a lattice of light pieces fixed together, and forming a geometrical combinations more or less complicated. The flat surface of the boards was even frequently carved in low relief (since the sculptors are confined in the thickness of the boards) in the compartments formed by the lattice.

Here (7) is an example of these works of joinery. The joinings of the boards are [illegible]. Here, was marked on our drawing. The lattice is formed as the rods one members of the frame, as indicated at [illegible] boards at upon inadvertence, thus formed a perfectly rigid surface, that prevents the warping of this board. This lattice is fixed to the joints with [illegible] as shown in o. The section 7 gives us o the thickness of the [illegible] turned columns alternately are one D, at certain distances o cross T maintain the work. At T we give the profile of this upper one C; at S is the profile of the rail c, and at n is the profile of the lower rail n. We shall see at once the I leaves of the door of the church of Vernet, compared to the [illegible].

[illegible] the cathedral of Tarentaise in 1284, and served as a [illegible] in chapel S. Jean. It was of fir.

The rail understand the shape of wood at used to square and interchange in all directions must maintain them in their

the chamfer of the hexagons are reddish brown, as well as the three notches of the stars; the latter were also bordered by a thin black line. The washers and iron rivets were also painted black.

Note 2.p.352. What is here given was drawn by us at Luxeil.

We could multiply these examples, but members of the trade will appreciate the entire system to be derived from these combinations without its being necessary to emphasize it.

In French joinery of the 14 th century are certain works t that indeed have some resemblance to the works of the orientals mentioned above, but whose structure however is more reasonable. Those enclosures, barriers and wainscots were simply formed of joined boards, rebated in a frame; to prevent the boards from bending and buckling as much as to decorate the plane surfaces, at least on one side, the joiner placed thereon a lattice of light pieces halved together, and forming g geometrical combinations more or less complicated. The flat surface of the boards was even frequently carved in low relief (since the sculpture was obtained in the thickness of these boards) in the compartments formed by the lattice.

Here (5) is an example of those works of joinery. The joints of the boards 12.6 ins. wide, are marked on our drawing. T The lattice is framed at its ends into the members of the frame, as indicated at a (see detail A) and is nailed to the b boards at each intersection, thus forming a perfectly rigid surface, that prevents the warping of this ground. This lattice is halved at the joints with dovetails at the mouldings as shown at b. The section C gives at c the thickness of the board and at d that of the lattice.[1] A balustrade of little turned columns surmounted the cap D, at certain distances p posts E maintain the whole. At F we give the profile of this upper cap f; at G is the profile of the rail g, aud at h is the profile of the lower rail h. We shall see at ouce the l leaves of the door of the church of Gannat, combined on the same principle.

Note 1.p.354. This work of joinery existed in fragments in the cathedral of Perpignan in 1834, and served as a wainscot in chapel S. Jean. It was of fir.

One will understand how strips of wood attached to boards and intersecting in all directions must maintain them in their

plane. However this system is exceptional in the joinery works of the middle ages in that we do not find the panels inserted in rebates, but as a simple ground on which is nailed a wooden network; this grille is not only applied decoration, but is composed of pieces assembled together and holds it self. From the 13 th century were fashioned in France works of joinery in which the system of panels inserted in rebates was a adopted; but then generally with tongues and grooves.

We give (6) one of those panels, shown in front at A, in s section at B, and in horizontal section at B′. This system m merits some attention. A wainscot is composed of muntins and rails, between which are grooved in panels. The end muntins forming the extremities of the wainscot receive the rails by tenons and morteses; while the intermediate muntins are tenoned into the rails. At C is seen an end muntin; at D is an intermediate muntin. In this case the moulding E of the rail is struck through without taking account of the joints. Then when it is necessary to connect the intermediate muntins, the moulding is cut away as indicated at F. Hence that moulding abuts against the heads of the muntins. Those are only chamfered or moulded on their free parts; the chamfers or mouldings stop at G by a cut, and leave to the muntin all its strength at the connections and to avoid always defective mitred joints. The panels H are inserted in grooves according to section I; if they are thinned at their edges to enter the grooves, they retain all their thickness at the centre as marked in section B′ at K. These panels are loose in their grooves and can shrink without inconveniences. The muntin and rails being assembled at right angles, the shrinkage due to the drying of the wood appears only in the joints, as always occurs in mitred joints. The entire system shrinks together. We give at L different modes of assembling the muntins and rails of the wainscot. At M the muntins have mouldings extending th through without taking account of the junctions of the rails and have the stops m at each connection. At N the muntins and rails both have stops at the connections of the muntins with the bottom rails or plinths. At M″N″O″ are the horizontal sections of the panels with the muntins.

When the wainscot is high it is necessary to divide its height by one or several intermediate rails that prevent too

long panels, always likely to warp. Thus (7) let a wainscot be 5.3 ft. high, one will first have a base or plinth A, into which will be tongued the bottom rail B. On this bottom rail will be assembled the intermediate muntins C, and itself will be tenoned into the end stiles D. The same system reversed w will be adapted for the top rail F and the cap E. But at G will be tenoned between the muntins cross rails H, so as to r reduce the length of the panels as we have stated. When this refers to wainscot attached to walls, these will often be simply set in rebates, as indicated in section I and retained by some iron clips. These panels nowise affect the framework, a and if they are made of dry wood, having only the width of a riven board or one sawn as we stated at the beginning of this Article, the entire work will suffer changes of temperature w without inconveniences. For the principal question in works of joinery is always to leave the wood the ability to swell o or shrink without affecting the connections. The tenons K of the muntins pass through the top rail and the cap so as to p prevent the warping of the latter, that does not fail to occur when these caps or mouldings are simply tongued into the top rail. Indeed, the thickness of these caps or mouldings being greater than that of the top rail, when they warp they have more power to split off the tongue made with the grain. This system of paneled wainscot was adopted during the 13 th and 14 th centuries with varying profiles. As for the connections they are always full up to the 15 th century, i.e., made in the members retaining their square forms.

The example that we give in Fig. 7 shows the mouldings of all the rails struck without stops and those of the muntins with stops at the connections. Even when the moulding enclosing the panel extends on the muntins and rails without stops, as we see practised frequently in wainscot of the 15 th century, mitred joints are avoided. We find an example of one of the pretty wainscots that line the chapels of the nave of the church of Semur-en-Auxois (8). The muntins and rails of this wainscot are 1.6 ins. thick; it is seen that the profile of the frame A is rounded in a quarter circle to continue along the muntins, but the connections are always solid and without mitres. This enclosing moulding does not return on the intermediate rail B, and that has slight chamfers with stops at

each joint. As for the lower panels, they have no enclosing mouldings but chamfers as if to give more solidity to this base. A cap C, whose profile is given at C′, is nailed on the face of the top rail. In the upper frieze D, perforated panels are set lengthwise to lighten the woodwork. The solid panels are only 7.9 ins. wide (9 ins. including tongues), 3/8 in. thick at the edges, but are reinforced by those projections r representing folded parchments. (See the horizontal section E made at the level e, and the section F made at the level f). At G is traced the vertical section of the wainscot, at H is the profile of the rail A, and at I is the stop of the enclosing moulding at the cross rail.

We give (9) several examples of these reinforcements of panels representing folded parchments. Example A shows the little decorated rolls passing behind those parchments.

In joinery preceding the 15 th century it was often customary, especially for furniture, to cover the panels with ass' skin or linen glued on the wood by means of cheese or skin glue. When this woodwork became old these facings must in part leave the warped wood; hence the folds of the recurved edges. It is to be presumed that the joiners had the idea of deriving from these accidents an ornamental motive and a means of giving thickness to the panels, while leaving their edges and t tongues very thin. Hence those panels with folded parchments so much in vogue during the 15 th and the beginning of the 16 th centuries.

Our workmen of the middle ages were not only skilled artizans, but they were observers, attentive to profit by all that chance caused them to discover. A defect, the effect of time on the materials, became for them a motive of improvement or of ornament. loving their trade because it was the result of thoughtful labor, and not a vague and unexplained tradition of a foreign art, they followed their own genius, invented n new combinations in the daily observation in the workshop, wi without borrowing outside the forms, whose meaning no longer had any meaning for them. Architects for a long time have already diverted joinery from its true line by desiring to impose on it forms not in harmony with its resources. During the two last centurier have been imitated many things by the aid of joinery, stucco, marble, stone, bronze, columns, hangings,

projecting cornices, arches, all executed joinery, and yet in the name of Greek classical art. On the contrary it would seem that classical art consists in using wood, stone or metal according to the properties peculiar to each of these materials. If we open a treatise on joinery of those last times, we shall learn see what for forming columns are made, arches and intersections of curves, corbels, trusses with tirants and pieces, so as to imitate in wood masonry works; how are made doors with side frames, consoles and cornices projecting i.e. ft., how all that can only be fixed by nails, bars, screws and glue. In that joinery have ended by no longer knowing to execute actual joinery, and that only for a small number of years some of that have commenced to learn again that art, practised four hundred years since with so much knowledge and taste. But it is always in the provinces of the north that at least be sought works in joinery worthy of this name. Let us now consider successive with doors, solid or open leaves and windows.

XIII. Doors. Leaves.

The oldest doors that we still find scattered in some French provinces do not precede the 11 th century, and it must be stated that at that epoch these joinery works are very rare. They consist of a series of simply joined planks, bounded by other planks so arranged as to be fastened to the former by nails. According to this principle are arranged the leaves of the doors of the cathedral of Sur-en-Velay and a leaf of the door of the church of Vodle-Saint (10). On the upper side of this door appear only a series of joined planks; on the exterior 3 other planks are placed across the former and are nailed, presenting an appearance of panels covered by flat ornaments.[1] It is given the section of the door made on a c. This sort of joinery is entirely original, like the ornaments that decorate it. One sees neither connections nor conditions both light and solid, that composes works of joinery. These are planks nailed on each other and nothing more. Very soon later than that epoch, one still sees in the provinces of the centre of France doors, that start from the same principle, however less rudely executed. There exists in the church of Saint a door with two leaves (11), where each leaf is composed of four joined pieces. To make them solid and to prevent warping, the workman has placed outside a wooden framework f

projecting cornices, arches , all excepting joinery, and this in the name of grand classical art. On the contrary it would seem that classical art consists in using wood, stone or metal according to the properties peculiar to each of those materials. If we open a treatise on joinery of those last times, we shall then see what? How Corinthian columns are made, arches and intersections of curves, corbels, trumpets with timbers s and planks, so as to imitate in wood masonry works; how are made doors with wide frages, consoles and cornices projecting 1.6 ft., how all that can only be fixed by angles, bars, screws and glue. So that joiners have ended by no longer knowing to execute actual joinery, and that only for a small number of years some of them have commenced to leary again that art, practised four hundred years since with so much knowledge and taste. But it is always in the provinces of the north that must be sought works in joinery worthy of this name. Let us now occupy ourselves with doors, solid or open leaves and windows.

HUIS. Doors. Leaves.

The oldest doors that we still find scattered in some Fremh provinces do not precede the 11 th century, and it must be r stated that at that epoch these joinery works are very rude. They consist of a series of simply joined planks, doubled by other planks so arranged as to be fastened to the former by nails. According to this principle are arranged the leaves of the doors of the cathedral of Puy-en-Velay and a leaf of the door of the church of Voulte-Chilhac (10). On the inner side A of this door appear only a series of joined planks; on the exterior B other planks are placed across the former and are nailed, presenting an appearance of panels covered by flat ornaments.[1] At C is given the section of the door made on a b. This sort of joinery is entirely oriental, like the ornaments that decorate it. One sees neither connections not any combinations both light and solid, that compose works of joinery. These are planks nailed on each other and nothing more. Very much later than that epoch, one still sees in the provinces of the centre of France doors, that start from the same principle, though less rudely executed. There exists in the church of Ga Gannat a door with two leaves (11),[2] where each leaf is composed of four joined boards. To make them solid and to prevent warping, the workman has placed outside a wooden framework f

formed nearly square panels. At A is presented the inside of the door. The detail B gives half of the extent of a leaf with its framework. Detail C indicates the mode of assemblage of the stiles and rails of the framework, the section D being a made on a b of the section F on e f. E presents the perspective connection of the rail, and F is the section at the jac. A nail with square diamond point head is set at the middle of each connection and in the rails and stiles between the connections. These nails at the joints of the boards have double points, clinched at right and left as seen at D. This work is solid, since it has remained in place since the 12 th century; but that is not a work of joinery as one sees it at that epoch and even earlier in the provinces of the North. The leaves of that door are held by hinges nailed on the inside, as indicated in Fig. A. The boards and the framework are of oak, and further the whole is well executed.

Note 1.p.321. See the interesting details of this door in architecture et les arts cul en Lorraine, by E. Collenbouvi.Tl.

Note 1.p.321. This drawing was communicated to us by E. Ma-let, architect.

Fig. 12 shows us the old leaves of the door of the nuper N. Cassella of Paris. This work of joinery dates from the middle of the 12 th century. Like the edifice it was formerly decorated by painting outside and inside. At A we present a leaf on the inside, at B on the outside. The ayrter consists of a frame strongly connected with two stiles, three rails and diagonals intended to transfer the entire weight of the door to the hinges. The rails are fixed to the stiles by dovetails, and the diagonals are bored besides the tenons, thus strengthening the work. On this frame are nailed boards tongued and grooved; then the decoration in this wood is nailed on these external boards. At C we have indicated the section of these bases. The hinges are placed inside on these rails.-- To have been only a single one of these hinge straps on the middle rail, they are doubled outside by thin iron straps ornamented by engraving. Into these rails fit themselves nail between two iron bands, and the nails of the hinge straps are riveted externally on these bands. Nails with square and very flat diamond heads also connect the boards and the framework. The nails with the semilateral area, rusee, crocketts and little

forming nearly square panels. At A is presented the inside of the door. The detail B gives half of the extent of a leaf with its framework. Detail C indicates the mode of assemblage of the stiles and rails of the framework, the section D being made on a b of the section F on e f. G presents the perspective connection of the rail, and F is the section at the lap. A nail with square diamond point head is set at the middle of each connection and in the rails and stiles between the connections. These nails at the joints of the boards have double ponits, clinched at right and left as seen at D. This work is solid, since it has remained in place since the 14 th century; but that is not a work of joinery as one sees it at that epoch and even earlier in the provinces of the North. The leaves of that door are hung by hinges nailed on the inside, as indicated in Fig. A. The boards andthe framework are of oak, and f further the whole is well executed.

Note 1.p.361. See the interesting details of this door in Architecture et les arts qui en dependent, by M. Gailhabaud.II.

Note 2.p.361. This drawing was communicated to us by M. Millet, architect.

Fig. 12 shows us the old leaves of the door of the upper S. Chapelle of Paris. This work of joinery dates from the middle of the 13 th century, like the edifice; it was formerly decorated by paintings outside and inside. At A we present a leaf on the inside; at B on the outside. The system consists of a frame strongly connected with two stiles, three rails and digonals intended to transfer the entire weight of the door to the hinges. The rails are fixed to the stiles by dovetails, and the diagonals are boxed besides the tenons, thus strengthening the work. On this frame are nailed boards tongued and grooved; then the decoration in this wood is nailed on these external boards. At C we have indicated the section of these bases. The hinges are placed inside on these rails.-- We have drawn only a single one of these hinge straps on the middle rail, they are doubled outside by thin iron straps ornamented by engraving. Thus those rails find themselves held between t two iron bands, and the nails of the hinge straps are riveted externally on these bands. Nails with square and very flat d diamond heads also connect the boards and the framework. The gable with its equilateral arch, cusps, crockets and little

columns, is only a facing built by Greeks. A strip original at the junction of the two leaves with a contemporary mullion, and it forms a sort of little buttress on the edge of the jamb. On the inside the stiles, rails and diagonals are chamfered between the connections and make the mortise lighter. These leaves were very much damaged by mischief out through the top-rs and were almost entirely lacking in their lower parts, and must be replaced during the restorations.

The use of this system of doors is very common during the 12 th and 14 th centuries. It is light and solid, and lends itself well to placing the fixtures for hanging. The doors of the cathedral of Paris, decorated externally by the beautiful ironwork so well known, are combined in the same manner and probably date from the beginning of the 14 th century. For we do not think that they have been rebuilt. Their outer surface behind the ironwork was originally covered by very bright c painting of a lady tone.

The cathedral of Poitiers still possesses the leaves of its doors that date from the beginning of the 14 th century. These works of joinery have a certain interest, because they serve as a transition from the leaves composed of a frame on which was applied a covering of oak planks or the leaves with panels grooved into the frame itself. Further note of these leaves are already furnished with mortises. Fig. 1: the diagonals are of those leaves at A for the inside and at B for the outside. The stiles a and b are thicker than the top and bottom rails; they are 7.1 ins. while the latter are only 5.9 ins. As for the intermediate rails, they are only 4.7 ins. Strips of the same thickness are assembled between these rails and receive panels between them, as shown at C, D and the detail E. In b the exterior the entire framework and the panels are in the same plane, and these panels are distinguished from the other parts only by a sunk level indicated at F in detail E. Diagonals frame into the stiles C and having not half their thickness prevent the leaf from being deformed and from straining the connections by its weight. At I is traced a perspective detail of the connection of the diagonals with the intermediate stiles; these pieces are connected at their intersections by nails T with square heads and double points clinched inside. At L is traced the detail of the strips, furnished with a

columns, is only a facing held by brads. A strike existed at the junction of the two leaves with a centralstone mullion, and it forms a sort of little buttress on the edge of the leaf. On the inside the stiles, rails and diagonals are chamfered between the connections and make the members lighter. Those leaves were very much changed by wickets cut through the doors and were almost entirely decayed in their lowe parts, and must be replaced during the restorations.

The use of this system of doors is very common during the 13 th and 14 th centuries. It is light and solid, and lends itself well to placing the fixtures for hanging. The doors of the cathedral of Paris, decorated externally by the beautiful ironwork so well known, are combined in the same manner and probably date from the beginning of the 13 th century, for we do not think that they have been rebuilt. Their outer surface beneath the ironwork was originally covered by very bright p painting of a laky tone.

The cathedral of Poitiers still possesses the leaves of its doors that date from the beginning of the 14 th century. These works of joinery have a certain interest, because they serve as a transition from the leaves composed of a frame on which was applied a covering of oak planks on the leaves with panels grooved into the frame itself. Further some of these leaves are already furnished with wickets. Fig. 12 bis presents one of those leaves at A for the inside and at B for the outside. The stiles a and b are thicker than the top and bottom rails; they are 5.1 ins. while the latter are only 3.9 ins. As for the intermediate rails, they are only 3.2 ins. Stiles of the same thickness are assembled between these rails and receive panels between them, as shown at C, D and the detail P. On t the exterior the entire framework and the panels are in the same plane, and these panels are distinguished from the other parts only by a sunk bevel indicated at G in detail P. Diagonals framed into the stiles C and having but half their thickness prevent the leaf from being deformed and from straining the connections by its weight. At I is traced a perspective detail of the connection of the diagonals with the intermediate stiles; These pieces are connected at their intersections by nails K with square heads and double points clinched inside. At L is traced the detail of the strike, furnished with a

little octagonal columns projecting outside. C shows the portal seen at c, D the plan p, E the case e. These details are at the scale of 1 : 10.

It was only at the end of the 14 th century that joiners undertook to make canal doors, i.e., with similar external and internal faces, composed of stiles and rails between which were grooved panels made of planks or lattice. The centre of Notre Dame of Semur still possesses at the beginning of the side aisles of the choir on the North side a door of that kind, which leads from the end of the 14 th century (17).

At A is given one of the faces of this door composed of two side stiles, two top and bottom rails, and three other intermediate rails and two muntins hanged into the rails. At B is drawn the detail of a rail C with the intermediate muntin D connected to the end of the canal E. At F is the horizontal section of a canal with two muntins; at G is the vertical section of a rail with two canals and their tenons; at H are give the perspective detail of a muntin removed, its upper end being at h. Already the canals are reinforced at their middle as indicated by the section F, and the little mortise of the muntins and rails that receive between them the tenons of the canals left free elsewhere. At the lower part of these canals chamfers cut backwards on the rails reduce tenons, so as to not weaken them. These tenons are wedged at the upper part of the canals and also on the lower chamfers as indicated by our perspective detail H. Thus the canals and rebates can be arrange alone the muntins and rails without removing, and the tenons could make later, by cutting away the rebate and chamfers where necessary to pass above and underneath. It is well understood that this door is of oak, like the preceding examples.

But the 14 th century also remarkable work in joinery: there remain to us from that epoch very beautiful stalls (18). Tradition of cabinet worker and assembled by the hand of a master. Indeed, love of change and fashion have always led or caused to disappear a considerable number of these works. It is necessary later to seek the remains in some sacristies, to collect some traces of them preserved by old antiquaries or travelers. Formerly, Sixteenth, Seventeenth and Eighteenth were particularly rich in beautiful works of joinery. The ins-

little octagonal column projecting outside, Q being the capital shown at c, R the ring r, S the base s. These details are at the scale of 1 : 10.

It was only at the end of the 14 th century that joiners undertook to make panel doors, i.e., with similar external and internal faces, composed of stiles and rails between which were grooved boards with rebates or tongues. The church of Notre Dame of Beaune still possesses at the beginning of the side aisles of the choir on the North side a door of that kind, which dates from the end of the 14 th century (13).

At A is given one of the faces of this door composed of two side stiles, two top and bottom rails, and three other intermediate rails and two muntins tenoned into the rails. At B is drawn the detail of a rail C with the intermediate muntin D connected to the end of the panel E. At F is the horizontal section of a panel wit the two muntins; at G is the vertical section of a rail with two panels and their tongues, at H we give the perspective detail of a muntin removed, its upper end being at a. Already the panels are reinforced at their middle as indicated by the section F, and the little rounds of the muntins and rails that receive between them the tongues of the panels left free elsewhere. At the lower part of these panels chamfers cut through on the rails replace these rounds, so as to not catch dust. These rounds are mitred at the upper part of the panels and stop on the lower chamfers as indicated by our perspective detail H. Thus the rounds and chamfers can be struck along the muntins and rails without stops, and the joints being made later, by cutting away the rounds and chamfers where necessary to make stops and mortises. It is well understood that this door is of oak, like the preceding examples.

But the 14 th century made remarkable works in joinery: there remain to us from that epoch very beautiful stalls (Art. Stalle), fragments of woodwork wrought and assembled by the hand of a master. Neglect, love of change and false taste have allowed or caused to disappear a prodigious number of these art works. It is necessary today to seek the remains in some museums, to collect some traces of them preserved by old engravings or drawings. Normandy, Picardy, Champagne and Burgundy, were particularly rich in beautiful works of joinery. The lea-

leaves of the roots, very slender until late spring, because although there was a notion of decoration in wood. Applications of process were restricted, also material indeed, overlaids of precious metal leather, to give the wood the richest form, yet although abandoning the principles of true construction, that certain to history. Even constructed specimens were left in the lavers of dorse, and if they were of too large dimensions to be opened at any moment, niches were made in them, as could be noted already in the example given in fig. 17 via.

Here (14) is one of those doors. The framework is composed of two side stiles, two top and bottom rails, the mid intermediate rail, two diagonals D forming a table, and two intermediate muntins C, halved to the diagonals in the upper part and serving as stiles for the midst in the lower part. The panels a of the upper portion were open and probably glazed. To make the construction of this front hard understood, we give at O the section made on a b, showing the shape of the intermediate muntins, at P is the section made on c d of the table; at Q the section made on e f, at R the section made on the intermediate rail e with the stiles i of the midst, at the section made on the lower rail with the stiles i of the midst; at O the vertical section made on the lateral bands of the lower part, at P the section made on m n; at Q the angle of the entirety, and at R is that of the tenants.

Note 1.p.222. From a drawing from the collection of the late governor. This door opened on one of the front halls of the abbey S. Pian of Tuscan, and it seems to have still existed at the end of the last (19 th) century.

There still exist a good number of leaves of the 15 to century, as small site tables of the south portal of the cathedral of Pardes, those of the principal portal of the church Pons of Pearls, those of the principal door of the mansion of Jacques Coeur at Pardes, those of the outer portal of the library of the cathedral of Tosen, those of the hospital of Pesque, as among the most remarkable. There were frequently employed in the 15 th century these leaves with openings, either for closing vestibules, chapels, oratories or even closets, i.e., cabinets opening from a chamber. These leaves with openings were even sometimes divided and could be folded like our solfiere, so as to not occupy space in the little rooms

leaves of the doors, very simple until that epoch, became afterwards a motive of decoration in wood. Applications of bronze were renounced, also historical ironwork, coverings of painted leather, to give the wood the richest forms, yet without abandoning the principles of true construction, that pertain to joinery. Then sometimes openings were left in the leaves of doors, and if they were of too large dimensions to be opened at any moment, wickets were made in them, as could be noted already in the example given in Fig. 12 bis.

Here (14) is one of those doors.[1] Its framework is composed of two wide stiles, two top and bottom rails, the wide intermediate rail, two diagonals B forming a gable, and two intermediate muntins C, halved to the diagonals in the upper part and serving as stiles for the wicket in the lower part. The panels A of the upper portion were open and probably glazed. To make the construction of this great leaf understood, we give at D the section made on a b, showing the caps of the intermediate muntins, at E is the section made on c d of the gable; at F the section made on g h, at G the section made on the intermediate rail e with the strike i of the wicket, at K the section made on the lower rail with the strike i of the wicket; at O P the vertical section made on the lateral panels of the lower part, at R the section made on n p; at S the scale of the entirety, and at s is that of the details.

Note 1.p.368. From a drawing from the collection of the late Gerneroy. This door opened on one of the great halls of the abbey S. Ouen at Rouen, and it seems to have still existed at the end of the last (18 th) century.

There still exist a good number of leaves of the 15 th century; we shall cite those of the south portal of the cathedral of Bourges, those of the principal portal of the church Notre Dame of Beaune, those of the principal door of the mansion of Jacques Coeur at Bourges, those of the outer portal of the l library of the cathedral of Rouen, those of the hospital of Beaune, as among the most remarkable. There were frequently employed in the 15 th century these leaves with openings, either for closing vestibules, chapels, oratories or even closets, i.e., cabinets opening from a chamber. These leaves with openings were even sometimes divided and could be folded like our shutters, so as to not occupy space in the little rooms

was left open. The still seen at the entrance of the porte cochère of the centre of lower-en-Auxois one of those doors masked with perfect taste (17). This door is composed of two leaves, each folding in two parts. At a we present the exterior of a leaf and at F the interior. The horizontal section C is made at the level C of the section E at the level f. The division is indicated at F and the strike of the two leaves at H. At I is traced the vertical section of the upper rail and of the entablatura rail. At V is the section a b at full size. This pretty joinery still retains its trouvère, a union is very finely executed (Art. Serrurerie). All this c ooms easily and is agreeable to the hand; it is indeed joinery of an apartment, light and elegant, solid and made for d aily use. However, nothing is more simple than its construction, as shown by our Fig. Here the mouldings enclosing the panels are returned without stops, but are not mitred, the square returns of these mouldings being cut across the grain of the muntins. The projecting strikes of the middle of the divisions are glued on the muntins like the mouldings L. These are neither nails nor screws; the iron fixtures alone are held by means of glue very skillfully arranged to weaken neither these fixtures nor the wood.

Inside the stages of windows were placed in the apartments solid or open shutters, that were actual leaves. The openings of these shutters were sometimes made in their lower portion to allow one to look outside without opening the shutters. Fig. 1 represents one of these shutters i made solid but made of great thickness; the principal frame 3 (see section 7 made on a b) encloses a second mass 7, that supports the panels 8. At 9 we have drawn the section made on e; at 7 is the section of the two interpenetrate rails with the stile. The lower panels are delicately carved to the profile 5, the secondary masters of that opening only having the thickness 61. *Note 1.p.272. From a house at Abbeville, Rue du Wauxhall-du-Pont.*

The art of joinery in the 15 th century reached a perfection in execution never attained since. The trade then dominant in architecture further lent itself to forms that suited joinery, since the norms in stone had the defect of realizing the delicate combinations given by the use of wood. The joiners of the 15 th century employed only woods perfectly purified,

when left open. One still sees at the entrance of the north chapels of the church of Semur-en-Auxois one of those doors executed with perfect taste (15). This door is composed of two leaves, each folding in two parts. At A we present the e exterior of a leaf and at B the interior. The horizontal section C is made at the level D of the section E at the level F. The division is indicated at G and the strike of the two leaves at H. At I is traced the vertical section of the upper rail and of the intermediate rail. At K is the section a b at full size. This pretty joinery still retains its ironwork, w which is very finely executed (Art. Serrurerrie). All this o opens easily and is agreeable to the hand; it is indeed joinery of an apartment, light and elegant, solid and made for d daily use. However, nothing is more simple than its construction, as shown by our Fig. Here the mouldings enclosing the panels are returned without stops, but are not mitred, the square returns of these mouldings being cut across the grain of the muntins. The projecting strikes of the middle of the divisions are pinned on the muntins like the mouldings L. There are neither nails nor screws; the iron fixtures alone are held by means of clips very skilfully arranged to weaken neither these fixtures nor the wood.

Inside the sashes of windows were placed in the apartments solid or open shutters, that were actual leaves. The openings of these shutters were sometimes made in their lower portion to allow one to look outside without opening the shutters.

Fig. 16 represents one of these shutters [1] made solid and made of great thickness; the principal frame A (See section B made on a b) encloses a second sash C, that supports the panels D. At E we have drawn the section made on e; at F is the section of the two intermediate rails with the stile. The lower panels are delicately opened to the profile E, the secondary members of that opening only having the thickness h i.

Note 1.p.370. From a house at Abbeville, Rue du Moulin-du-Roi.

The art of joinery in the 15 th century reached a perfection in execution never attained since. The taste then dominant in architecture further lent itself to forms that suited joinery, since the works in stone had the defect of recalling the delicate combinations given by the use of wood. The joiners of the 15 th century employed only woods perfectly purified,

dry and sound, and they worked with skill, that we have great difficulty to attain today, even when we desire to pay for the workmanship. The joinery of the second half of the 15th century is no very rare in France, and due to the excellent selection and dryness of the woods employed, this joinery is well preserved, is neither deformed nor cracked, and is only injured where placed in conditions entirely unfavorable.

To close our study of doors, and leaves of doors, we shall give here one of these, that closes the principal entrance of the nave of Notre Dame of Reims. The construction of these leaves (17) is simple and it consists of 20 panels tongued in between the stiles and rails; a wicket is composed of four panels a and cross at the middle of the leaf. Two stiles, two top and bottom rails, three intermediate meeting with four intermediate rails form the frame of that leaf. The stiles are reinforced by buttresses and intermediate rails by projecting moldings. These buttresses and the panels are delicately modeled and carved in beautiful oak wood.

To give (18) more details of this work of joinery, i.e., the panel b and part of the lower one c with the buttresses and stiles and profiles of the intermediate rails. At A is traced the section of these details made on c f; at B is the horizontal section of a stile with its buttress, at C the section at a larger scale of the moldings out in the thickness of the panels. This mode of characterizing the panels by concentric to mail thickness and representing the tracery of windows was much in vogue in the 15th century, and it was necessary for these panels to be very easily and rapidly carved, for they are found everywhere. The working joiners fashioned these works by means of long chisels, gouges and graveers, with handles indicated by the sketch D. The great gouge 4 often terminated in a sort of scoop like the tools used by makers of wooden shoes, was used in both hands, the piece of wood around being kept horizontal on the bench by means of a clamp or screw as practiced today.[1]

Note 1.p.272. We have frequently seen structures of sanctuaries of the 15 th century in which these tools are represented. There exists in the stalls of the church of **MONTREUIL** *a relief representing a joiner covered a little pinnacle by means of the tool represented at 1, which he holds in his right*

dry and sound, and they worked with skill, that we have great difficulty to attain today, even when we desire to pay for t the workmanship. The joinery of the second half of the 15 th century is no very rare in France, and due to the excellent selection and dryness of the woods employed, this joinery is well preserved, is neither deformed nor cracked, and is only injured where placed in conditions entirely unfavorable.

To close our study of doors, and leaves of doors, we shall give here one of those, that closes the principal entrance of the nave of Notre Dame of Beaune. The construction of these leaves (17) is simple and it consists of 20 panels tongued in between the stiles and rails; a wicket is composed of four p panels a and opens at the middle of the leaf. Two stiles, two top and bottom rails, three intermediate muntins with four i intermediate rails form the frame of that leaf. The stiles are reinforced by buttresses and intermideate rails by projecting mouldings. These buttresses and the panels are delicately moulded and carved in beautiful oak wood.

We give (18) some details of this work of joinery, i.e., the panel b and part of the lower one c wit the buttresses and stiles and profiles of the in ermediate rails. At A is traced the section of these details made on e f; at B is the horizontal section of a stile with its buttress, at C the section at a larger scale of the mouldings cut in the thickness of the p panels. This mode of ornamenting the panels by compartments cu to half thickness and representing the tracery of windows was much in vogue in the 15 th century, and it was necessary for these panels to be very easily and rapidly carved, for t they are found everywhere. The working joiners fashioned these works by means of long chisels, gouges and gravers, with handles indicated by the sketch G. The great gouge g often terminated in a sort of spoon like the tools used by makers of w wooden shoes, was used in both hands, the piece of wood wrought being kept horizontal on the bench by means of a clamp or screw as practised today.[1]

Note 1.p.373. We have frequently seen miniatures of manuscripts of the 15 th century in which these tools are represented. There exists in the stalls of the church of Montreale a relief representing a joiner carving a little pinnacle by means of the tool represented at l, which he holds in his right

tant. At the people this just appears to be at least in jest. I know. As for the effect, it was in frequent use, as in our days.

All the panels of these leaves of the doors of the ambrosia reader are of varied textile; sometimes instead of these cover-ettes of tracery were carved reliefs or arabesques about the end of the 15th and the beginning of the 16th centuries. Among the beautiful examples of leaves, we should not omit those of the doors of Jacques E. Prelion of Tours, attributed to Jean Goujon, and if not by him, at least they present one of the best examples of the Tourney of the Renaissance.

Cupboard. Windows. Panes.

We explained in Article Panetre how during the Romanesque period the openings of windows were not often closed, except by shutters at night, and how to obtain light in the interior of rooms, air was allowed to enter with the light into the apartments. These shutters at first were pierced by small open-ings over which was stretched parchment or canvas, or even a covered by a piece of glass. That danger was long retained a among the people of the Centre and South of France; but in the North the rigor of the climate and the insufficiency of external light compelled the inhabitants of cities and castl-es to make actual windows suited to receive a large surface of glass or parchment. In the 12 th century these windows or win-dows (to apply to them the name associated by custom), were still only actual shutters composed of bolts and rails, but those wooden panels were replaced by glass or by oiled yellow.

Of these works of Tourney still very few remains. Yet at Paris in the tower called Tiquetta, the old conventary of the Templars, and that was destroyed nine years since, there still existed in a window of the highest story, composed of two ca-ra separated by a mullion, two window leaves that appeared to belong to the epoch of the construction of that tower (1-ust 1306). Yet in an enclosure of plaster already old, they were able to escape destruction, and although entirely rotten, they still retained fragments of white glass set in rebates. Fig. 19 gives the inner surface of one of those window leaves with its tronpoire. At A we give the section on a b, and at B the horizontal section on c d. This sort of glass admits al-lowed little light to enter, relatively to their areas; but then men did not require much light in interiors, as they to

hand. At the scale this tool appears to be at least 20 ins. l long. As for the chisel, it was in frequent use, as in our days.

All the panels of these leaves of the doors of the church of Beaune are of varied design; sometimes instead of these compartments of tracery were carved reliefs or arabesques about the end of the 15 th and the beginning of the 16 th centuries. A Among the beautiful examples of leaves, we should not omit t those of the doors of church S. maclou of Rouen, attributed to Jean Goujon, and if not by him, at least they present one of the best examples of the joinery of the Renaissance.

CROISEES. Windows. Sashes.

We explained in Article Fenetre how during the Romanesque period the openings of windows were not often closed, except by shutters at night, and how to obtain light in the interiors of rooms, air was allowed to enter wit the light into the apartments. These shutters at first were pierced by small openings over which was stretched parchment or canvas, or even c covered by a piece of glass. That custom was long retained a among the peoples of the Centre and South of France; but in the North the rigor of the climate and the insufficiency of external light compelled the inhabitants of cities and castles to make actual sashes suited to receive a large surface of glass or parchment. In the 12 th century these sashes or windows (to apply to them the name sanctioned by custom), were still only actual shutters composed of stiles and rails, but whose wooden panels were replaced by glass or by oiled vellum.

Of these works of joinery exist very few remains. Yet at P aris in the tower called Bichat's, the old commandery of the Templars, and that was destroyed nine years since, there still existed in a window of the highest story, composed of two parts separated by a mullion, two window leaves that appeared to belong to the epoch of the construction of that tower (about 1160). Set in an enclosure of plaster already old, they were able to escape destruction, and although entirely rotten, they still retained fragments of white glass set in rebates. Fig. 19 gives the inner surface of one of those window leaves with its ironwork. At A we give the section on a b, and at B the horizontal section on c d. This sort of glazed sashes allowed little light to enter, relatively to their areas; but then men did not require much light in interiors, as they do

today. These masses were without frames and set into recesses in the stone openings.

In the 14 th century men were already no longer satisfied with such small openings, windows became rich and wide, their mullions were diminished in thickness, and consequently the window masses were made lighter to allow the light better to enter the halls. The masses in the history of the 14 th century exist except in fragments, and it is necessary to collect such scattered data to be able to restore an entire mass. The fixing of the fixtures and the rebates preserved in the masses, the traces of the strike remover still exist in a great number of buildings. At the date of 1400, at Cluny (second half of the 15 th century), at Carcassonne (end of 15 th century), at Cossey, at Chateau-Gaillard, at the palace of Justice of Paris, and in several castles and houses in our old provinces, it is easy to determine the condition of the glazed masses, their fastenings and thickness. Then by seeking with some care, one also finds here these remains of this joinery, repaired many times, it is true. Thus in the many buildings of Chateau-Gaillard, we have found a window almost entire by seeking certain primitive fragments among years alone, among repaired masses.

We give (20) the result of these researches. These masses were double in the first windows and were separated by a mullion; later were composed of a mullion 3 with iron sins at the top and bottom, fixed to the mullion itself. These two sins a colored glass set in the stone, as one can still see in the a interiors of the windows of the houses of the Justicians at Cluny, and many other mutilations of the 14 th century. This mass was set in solidity; the strike - sent into a rebate on the mullion of the window and was held by two bolts fixed by a round iron rod vi a handle (art. Serrurerie). The two small square rails were fastened into the two mullions. A small intermediate mullion was fixed in the top and bottom rails, and in the line received two other iron intermediate rails 3 and two lighter cross-bars 4. Little molasses 5 took the place of glass bars. On the outside the mullion and rails were provided with rebates 3 (see detail 2) intended to receive the glass panels. In for the glass bars they had no rebates but iron buttons 1, that served to hold the panels. These window masses

today. These sashes were without frames and shut into rebates in the stone openings.

In the 13 th century men were already no longer satisfied w with such small openings, windows became high and wide, their mullions were diminished in thickness, and consequen ly the w window sashes were made lighter to allow the light better to enter the halls. The sashes in the joinery of tha time no l longer exist except in fragments, and it is necessary to collect much scattered data to be able to restore an entire sash. The fixing of the fixtures and the rebates preserved in the j jambs, the traces of the strikes however still exist in a great number of buildings. At the gate of Laon, at Coucy (beginning of the 13 th century), at Carcassonne (end of 13 th century), at Loches, at Chateau-chinon, at the palace of Justice of Paris, and in several castles and houses in our old provinces, it is easy to determine the position of the glazed sashes, their fasteniugs and thickness. Then by seeking with some care, one also finds here these remains of this joinery, repaired many times, it is true. Thus in the abbey building of Chateau-Landon, we have found a window almost entire by seeking certain primitive fragments some years since, among repaired sashes.

We give (20) the result of these researches. These sashes were double in the great windows and were separated by a mullion; they were composed of a muntin A B with iron pins at the top and bottom, fixed to the muntin itself. These two pins e entered eyes set in the stone, as one can still see in the e interiors of the windows of the house of the Musicians at Rheims, and many other habitations of the 13 th century. Thus the sash was set in building; the strike C shut into a rebate on the mullion of the window and was held by two bolts moved by a round iron rod wi h handle (Art. Serrurerie). Two top and bottom rails were tenoned into the two muntins. A third intermediate muntin was fixed in the top and bottom rails, and in its turn received two other strong intermediate rails D and two lighter cross-bars E. Little columns F took the place of sash bars. On the outside the muntins and rails were provided with rebates G (see detail H) intended to receive the glass panels. As for the sash bars they had no rebates but iron buttons I, that served to hold the panels. These window sashes

were fitted inside with divided shutters (see horizontal section X) and separated in three parts a b c, so as to be able to open as easily that only one division, or one half or two thirds of a division. Because of the jamb of the window, these shutters fitted at a moving only to the right angle and were arranged a indicated by the dotted lines L. Outside, these shutters presented at the side of the window the ends L, and their divided nights were closed on the inside d. The upper a and lower panels of the shutters were perforated to give light in the interior when the shutters were closed, and to allow one to look outside through the lower opening d. The mouldings of the seen are 2 inc. thick, those of the shutters being 1½ inc. at U are given the details of the little column and their profile as at U'; at V is the section of the intersection of the mouldings, at V the section of the cross-bars E; at O the vertical section of the rails of the shutters, and at O' the horizontal section of their stiles. P is the lateral of the lower opening. The shutters were fixed on the sash of the sash by hinges fixed outside on little iron plates. This sash did not have a water drip; the rainwater that flowed down their external surface was collected in a little gutter cut in the sill and leading outside. Finally, the shutters were kept closed by means of bolts entering staples fixed on the internal projection of the stone sullion, and at each by bars.

To set these sashes, there was no holes or fastenings to make afterwards in panels, pedestal or sclave; the article came to its place complete and finished in the workshop, without its being necessary as now practised in our structures, to send successively workmen of two or three trades to finish the setting of the ironwork of a window. The masonry, carpentry, joinery and ironwork, were finished simultaneously, and when the roofs were covered, there was nothing more than to paint and to send the tapestries. Then the window sashes did not swing on pins like these, when they were set afterwards, the hinges that had been were fixed in the beds of the masonry during the construction, so as to avoid nails and holes for fixing, that injure the fronts of our houses and palaces.

Window sashes of houses of the 14 th century were often similar than these and were only composed of mullions, strikes and rails. The sash bars were useless when were employed glass p

were fitted inside with divided shutters (see horizontal section K) and separated in three parts a b c, so as to be able to open as seemed good only one division, or one third or two thirds of a division. because of the jamb of the window, those shutters divided at g moving only to the right angle and were arranged a indicated by the dotted lines l. Unfolded, these shutters presented at the side of the window the Fig. L, and their divided hinges were placed on the inside g. The upper a and lower panels of the shutters were perforated to give light in the interior when the shutters were closed, and to allow one to look outside through the lower openings. The muntins of the sash are 2 ins. thick, those of the shutters being 1 1/2 ins. at H are given the details of the little column and their profile as at H'; at M is the section of the intermediate muntin, at N the section of the cross-bars E; at O the vertical section of the rails of the shutters, and at O' the horizontal section of their strikes. P is the detail of the lower openings. The shutters were fixed on the muntin of the sash by hinges riveted outside on little iron plates. This sash did not have a water drip; the rainwater that flowed down their external surface was collected in a little gutter cut in the sill and leading outside. Finally, the shutters were kept closed by means of bolts entering staples fixed on the internal projection of the stone mullion, and at need by bars.

To set these sashes, there was no holes or fastenings to m make afterwards in panels, rebates or splays; the article came to its place complete and finished in the workshop, without its being necessary as now practised in our structures, to send successively workmen of two or three trades to finish t the setting of the ironwork of a window. The masonry, carpentry, joinery and ironwork, were finished simultaneously, and when the roofs were covered, there was nothing more than to paint and to hang the tapestries. When the window sashes did not swing on pins like these, when they were set afterwards, the hinges that held them were fixed in the beds of the courses during the construction, so as to avoid cuts and holes for fixing, that injure the fronts of our houses and palaces.

Window sashes of houses of the 14 th century were often simpler than these and were only composed of muntins, strikes and rails. The sash bars were useless when were employed glass p

panels set in lead, and they commenced to appear in the sashes, when were substituted for panels set in leads, glass cut in quite large pieces from the circular sheets of glass with a knot at the centre. (Art. Vitrail). The window sashes of the middle ages then do not present the network of sash bars shown by the sashes of the 17 th century, and that produces such a displeasing effect by the monotony of those equal components cutting the area of the opening into a quantity of little parallellograms. The glass panels were fixed in the rebates of the sashes by means of a cement covered by a strip of parchment attached to tha cement, or simply for interiors where it was not important to obtain perfect tightness, by buttons of the sort reproduced above at I. Then between the panels, the buttons being opened, a strip of felt was introduced at the junction of these panels, the strip being cut at each button; then these we e closed and exerted a pressure on this felt, and prevented the glass from shaking. That custom was long retained in the provinces of the Centre, since we have still seen these felts and buttons fixed on sashes of the 16 th c century.

Window sashes of the 15 th century in mansions and castles sometimes formed a tolerably complicated work of carpentry. Mansion de la Tremoille at Paris still possesses in the story over the portico looking on the court, window sashes, very dilapidated and belonging to the original construction, dating from the end of the 15 th century. These sashes (21) are in windows composed of the cantral mullion and transom bar of stone. They consist then of four compartments; two large oblong below and two square ones. At A we give one of the lower sashes aud at B one of the sashes set above the bar.

These sashes had frames fixed in the stone rebates by clips as still practised today. The lower sashes could be opened in their entire height from a to be by means of handles, and partially by an inside sash from c to d. The upper sashes also opened by handles. At C is traced the section on e f, the sashes A B being viewed from the inside. At D is indicated the lower angle of the sash A with the water drips on the outside.

We have drawn at a double scale, i.e., at 1 : 10, at A' the section on g h; at F the section on i k; at G the section on l m; at H the section on m n, and at I the section on o p. At

i is given the position on r c and at X the section on i r. In the leaves of mulberry in f X f foliaire is parts are initial at a, base on the frame, and allow the glass to be curved inside.

These masses in wood are large and made with great care; these glass like here also set in rebates and cemented. Fig. 17 gives the junction of the lower water trio & at the vertical frame m. The base at 3 has the water trio of the arched wooden sash is nearly moved into the frame having a trio. This gives the profile a of that trio; this profile was trend so as to present rain driven by the wind from following the slope a b and according into the joint c. The curve 3 b causes the drop of water, driven by the wind over trio moulding, to follow the curve 3 c, i.e., to fall outside stairs. These details show also that attention the joinery of that epoch x made their drawings, and how they gave to ordinary a form so suitable for their places and purposes. It must be remembered that since that time we have not yet made wonderful progress in the art of joinery and building.

Turkish stairs were not formed then by means of inside iron angles as they now are; the treds of the angles that strengthen fore angles were fixed on the wood by means of nails and rivets (not not screw); it was then necessary that the connections of these masses should be very well made to avoid laterration and disconnection. Other details are a dull blind, but the joinery displayed like the wish to maintain the connection; then they already contributed on the exterior to assist the safety of the wood at these connections.

(Commerce, Stairs, Fashion).

Curved Surfaces, Gallerie, Partitions.

As we have already stated, the joinery of the middle ages knew how to break wood and to keep their grandeur without unnecessary dimensions, that were then nearly the same as those produced today by the mills. Particularly in large joinery the attention is found to be devoted to this important part of the art. The plank 1.7 to 1.8 lin. thick was generally employed for the framework, then that 4.5 lin. thick for the massive parts. As for the panels, they were rarely over 1/2 in. With these dimensions of the wood they composed their work; important joinery, such as arches, orders fronts, stalls, cloos

L is given the section on r s and at M the section on t v. Op Open leaves of shutters in V X Y folding in pairs are indicated at m, hung on the frame, and allow the glass to be covered inside.

These sashes in good oak wood were drawn and made with great care; these glass like ours were set in rebates and cemented. Fig. 22 gives the junction of the lower water drip A and the vertical frame B. One sees at B how the water drip of the great opening sash is partly housed into the frame having a drip. This gives the profile A of that drip; this profile was drawn so as to present rain driven by the wind from following the slope a b and ascending into the joint c. The curve d b compels the drop of water, driven by the wind over this moulding, to follow the curve d e, i.e., to fall outside again. These details show with what attention the joiners of that epoch m made their drawings, and how they gave to mouldings a form m suitable for their places and purposes. It must be recognized that since that time we have not made sensible progress in the art of joinery and building.

Window sashes were not ironed then by means of inlaid iron angles as they now are; the irons of the handles that sometimes form angles were fixed on the wood by means of nails and rivets (but not sunk); it was then necessary that the connections of these sashes should be very well made to avoid deformation and dislocation. Sunken angles are a good thing, but the joiners mistrusted them too much to maintain the connections; then they singularly contributed on the exterior to hasten the decay of the wood at these connections.

VOUSSURES, PLAFONDS, TAMBOURS.

Curved Surfaces, Ceilings, Partitions.

As we have already stated, the joiners of the middle ages knew how to treat wood and to keep their drawings within ordinary dimensions, that were then nearly the same as those produced today by the mills. Particularly in large joinery the attention is found to be devoted to this important part of t their art. The plank 1.5 to 1.6 ins. thick was generally employed for the framework, then that 3.2 ins. thick for the heaviest parts. As for the panels, they were rarely over 3/4 in. With these dimensions of the wood they composed their most i important joinery, such as drums, organ fronts, stalls, clock

cases, stairs, large grilles, etc. To give strength to these woods when they had great dimensions in height and prevent their from blocking, they inserted the timbers as indicated at A, for example, and assembled them in the timbers at base and one as seen at B and C. Further the ceiling were connected and maintained by massive O forming arches. The spaces were filled by free panels E, or assembled by tongues (Art. Italia).

Villars of Honnecourt [1] was observer for us a curious image of a great clock case of the 13th century in joinery. It is an actual cenotaphe that must have great importance. These are still seen such clock cases in great joinery of the 14th and 15th centuries in the cathedrals of Tarentaise and of Chaise.[2]

Note 1.p.390. See Album of Villars of Honnecourt, Pl.XI.

Note 2.p.390. See Quillhoux, architecture du Vx au XVII siècle.

Although there remain only a small number of fragments of the wooden windows, that frequently covered the walls of nearly during the 13th and 14th centuries, yet one can prove its use by numerous fastenings and traces that still exist on the surfaces of those walls; fastenings and traces indicating vestiges of great joinery covering entire rooms from floor to ceiling, and composed of members 1.6 ins. thick by 2.4 ins. wide with panels. Ceilings of joinery were made thus from the 14th century and persist before that epoch, or to be more correct, ceilings in the composition of which carpentry and joinery took their parts. Thus it is not rare to still find ceilings where the spaces between the beams, instead of being plastered, contained of boards placed crosswise, perforated as if covered by a board placed lengthwise (Fig).[1] But in Article 7 - about we shall have occasion to describe the different mixed combinations adopted by the carpenters and joiners of the middle ages.

Note 1.p.391. From a house of Tours.

In the 13th century and even also in the 14th, joinery ceilings instead of participating in the carpentry, as in the preceding example, were fastened to that by pendant keys. Fig. 25 shows one of those ceilings, alternately composed of corbels and soffits. The sketch A indicates in horizontal projection the system of framework, consisting of a series of equilateral triangles. The kingposts B into which are assembled the pieces D relieved by struts and suspended from the ioints

cases, stairs, large grilles, etc. To give strength to these woods when they had great dimensions in height and prevent them from buckling, they tongued the timbers as indicated at A, for example, and assembled them in the timbers at base and cap as seen at B and C. Further the muntins were connected and maintained by gussets D forming arches. The spaces were filled by free panels E, or assembled by tongues (Art. Stalle).

Villars of Honnecourt [1] has preserved for us a curious drawing of a great clock case of the 13 th century in joinery. It is an actual campanile that must have great importance. There are still seen such clock cases in great joinery of the 14 th and 15 th centuries in the cathedrals of Beauvais and of Rheims.[2]

Note 1.p.382. See Album of Villars of Honnecourt, Pl.XI.

Note 2.p.382. See Gotthebaud, Architecture du Ve au XVII siecle.

Although there remain only a small number of fragments of the wooden wainscot, that frequently covered the walls of castles during the 13 th and 14 th centuries, yet one can prove its use by numerous fastenings and traces that still exist on the surfaces of those walls; fastenings and traces indicating works of great joinery covering entire rooms from floor to ceiling, and composed of members 1.6 ins. thick by 3.4 ins. wide with panels. Ceilings of joinery were made thus from the 14 th century and perhaps before that epoch, or to be more correct, ceilings in the composition of which carpentry and joinery took their parts. Thus it is not rare to still find ceilings where the spaces between the beams, instead of being plastered, consisted of boards placed crosswise, perforated and covered by a board placed lengthwise (24).[1] But in Article Plafond we shall have occasion to describe the different mixed combinations adopted by the carpenters and joiners of the middle ages.

Note 1.p.384. From a house of Cordes.

In the 15 th century and even also in the 16 th, joinery c ceilings instead of participating in the carpentrw, as in the preceding example, were fastened to that by pendant keys. Fig. 25 shows one of those ceilings, alternately composed of corbels and coffers. The sketch A indicates in horizontal projection the system of framework, consisting of a series of equilateral triangles. The kingposts B into which are assembled the pieces D releived by struts and suspended from the doubled

joints indicated at E in the section C by means of keys F and corbices. The section D is made on a b and that at E on e f, and they explain the arrangement of the corbels and coffers. The arrris formed the corbels were covered by thin boards between them, and ornaments were carved on the edges of the rios. The coffers were raised more or less and decorated. The ayster was stopped again, but with some variations, in certain oeilides preserved to us by morterinds, or that still exist, such as those of the palaces of Jacques of Molen and of Paris. The old Chambre des Comptes, burned during the last (19 th) century, possessed a very beautiful example of this kind, that has served as in making the drawing of Fig. 75; it had been established under the reign of Louis XII, and because the sculpturess was entirely decorated by painting and gilding.

Note 1.p.255. Tocot. Le to Fromes. Imp. Library.

The trade of joinery received an extensive development of decorative decorary in the last times of the middle ages. It is easy to convince one's self then, if he will examine the details of the cathedral of Amiens and most of the works of joinery in the 1, 14 and 15 th centuries. The exposition demanded infinite care and time, for one cannot execute good joinery except by doing it at the time and money necessary, particularly the time. Then it required 15 days for a good journeyman joiner and 15 more days for a good carver to make a corner or coat of a pulpit, of a grille or a partition, and [illegible] that this post, turned so often on the beam, adjusted and reduced, was very dry and that all crannies had cracked before assisting; so those delicate joinery works of dry 14 in and 15 in centuries have not moved and have remained just as they were yesterday. Twelve years spent artists cross their work with extreme care, and left it for a last time to the apprentices before bringing it to the workyard.

(Marquetry. Garnetry. Tarsia Work.

Marquetry was not employed during the middle ages in France to decorate the joinery works of buildings; it was scarcely applied to furniture; also this marquetry was very rare particles in 14 th century. The master of vanessing with woods of different kinds in order to produce colored images, that could not be applied to the frame of Gothic joinery, which sim-

joists indicated at E in the section C by means of keys F and mortises. The section G is made on a b and that at H on e f, and they explain the arrangement of the corbels and coffers. The struts forming the corbels were covered by thin boards between them, and ornaments were carved on the edges of the ribs. The coffers were raised more or less and decorated. This system was adopted again, but with some variations, in certain ceilings preserved to us by engravings, or that still exist, such as those of the palaces of justice of Rouen and of Paris. The old Chambre des Comptes, burned during the last (18 th) century, possessed a very beautiful example of this kind, that has served us in making the drawing of Fig. 25; [1] it had been established under the reign of Louis XII, and besides the sculptures was entirely decorated by painting and gilding.

Note 1.p.285. Topog. de la France. Imp. Library.

The trade of joinery required an extensive knowledge of descriptive geometry in the last times of the middle ages. It is easy to convince one's self then, if he will examine the stalls of the cathedral of Amiens and most of the works of joinery in the 1, th and 16 th centuries. The execution demanded infinite care and time, for one cannot execute good joinery except by using in it the time and money necessary, particularly the time. When it required 15 days for a good journeyman joiner and 15 more days for a wood carver to make a corner p post of a pulpit, of a grille or a partition, one was certain that this post, turned so often on the bench, selected and reduced, was very dry and that all changes had occurred before setting; so those delicate joinery works of the 14 th and 15 th centuries have not moved and have remained just as they w were assembled. Besides those artizans chose their wood with extreme care, and left it for a long time in the storehouse before bringing it to the workyard.

MARQUETERIE. Marquetry. Inlaid Work.

Marquetry was not employed during the middle ages in France to decorate the joinery works of buildings; it was scarcely applied to furniture; also this marquetry was very rare before the 16 th century. The custom of veneering with woods of different tints in order to compose colored designs, that could not be applied to the forms of Gothic joinery, which alw-

always located on the perimeter. Architects caused their isolate works in joinery to be simplified and direct, but their construction was such, that it is possible to repeat them. As the preceding examples show. In the cemetery in Italy, architecture took its place in the joinery from the 14 th century; with also as we have stated, the forms given to that joinery are always in accord with the construction. In the matter of the works of French masonry, we only know of the books of the details of the chapel of the chateau of gaillon, and those are works of the beginning of the 16 th century. One can still see certain parts of the minor door of the chapel of the imperial church of S. Denis.

Architecture. Plot for arcaere.

We have seen elsewhere how permanent these fortifications were only defended from their tops. The curtains and towers were piled at the base and crowned to allegiance only the tribunes of their construction; but when missile casting machines were perfected, and had achieved a longer and surer range, a man no longer restricted themselves to crowning the parapets with battlements for overwhelming the approach to a strong place; openings were pierced at the base of the curtains and in the different stories of the towers. These openings appeared in fortifications from the beginning of the 12 th century; then quite rare, they multiplied during the 12 th century, and participated in the means of defense; about the middle of the 14 th century, these openings again became gradually rarer in the lower parts of the defenses and multiplied at their summits; they only reappeared at the moment when artillery replaced the ancient machines for defense. These plots for arcaere, pierced at the level of the ground inside the ramparts and of the floors of the towers, not only permitted shooting crossbows quite and arrows, but also to see without discovery the works that the assailants could attempt to batter or sap the works. Among the ancient sites mentioned, we shall cite those of the towers and curtains of the castle of the city of carcassonne. A castle whose construction dates at the beginning of the 12 th century. These plots (1) consist inside of a work of plans covered by a semicircular vault intended to receive at least the defender. The wall is reduced to a thickness of 1.4

always depended on the carpentry. Architects caused their delicate works in joinery to be painted and gilded, but their c construction was such, that it is not possible to veneer them, as the preceding examples show. On the contrary in Italy, marquetry took its place in the joinery from the 14 th century; but also as we have stated, the forms given to that joinery are always in accord wit the construction. In the matter of the works of French marquetry, we only know of the backs of the stalls of the chapel of the chateau of gaillon, and those are works of the beginning of the 16 th century. One can still see certain parts of the winter choir of the canons of the imperial church of S. Denis.

MEUTRIERE. Slot for Archers.

We have seen elsewhere [1] how permanent Roman fortifications were only defended from their tops. The curtains and towers were solid at the base and opposed to attacks only the thickness of their construction; but when movable casting machines were perfected, and had acquired a longer and surer range, m men no longer restricted themselves to crowning the parapets with battlements for preventing the approach to a strong place; openings were pierced at the base of the curtains and in the different stories of the towers. Those openings appeared in fortifications from the beginning of the 12 th century; then quite rare, they multiplied during the 12 th century, and participated in the means of defense; about the middle of the 14 th century, those openings again became gradually rarer in t the lower parts of the defenses and multiplied at their summits; they only reappeared at the moment when artillery replaced the ancient machines for defense. These slots for archers, pierced at the level of the ground inside the ramparts and of the floors of the towers, not only permitted shooting crossbow bolts and arrows, but also to see without discovery the works that the assailants could attempt to batter or sap the works. Among the oldest slots mentioned, we shall cite those of the towers and curtains of the castle of the city of carcassonne, a castle whose construction dates at the beginniug of the 12 th century. These slots (1) consist inside of a sort of niche covered by a segmental vault intended to receive at least one defender. The wall is reduced to a thickness of 2.3

ft. by the construction of the niche, and is pierced by an o
opening suited inside and very narrow on the exterior, so as
to cover the exterior by an angle of 25°. A lintel with a sem-
icircle cut in it covers this opening, and a very steep slope
terminates its lower part. The sketch A gives the plan of this
slot, B is its section on a b, C is its inside elevation, and
D is its external appearance. To give more range to the angle
of fire, the lower part of the slot, which is only 0.4 ins.
wide, is cut as indicated in the detail D: d being the plan
of the outer face of the section.

Note 1.2.222. Lyle, Architecture Military, Treasey.

The method that serves for drawing this bottom opening of
the slot is this (-): A B being the internal opening of the
slot; C D the opening desired to be given at the bottom, taking
the points a b at a distance of 0.2 ins.- from those points
a c are drawn the tangent lines a f, b e. Those notches were orig-
inally triangular, about the middle of the 19th century they
become circular, as is small shot then at once. These slots are
placed alternately in the tower, i.e., they are not placed
over each other, but solid over voids, so as to cover all
points of the circumference. It was only in the 19 th cent-
ury that men recognized in piercing the slots the use of a
constant method, a very artifully calculated mode of traction.
At that epoch slots strongly flanked the curtains at their ba-
se and sources, so as to suffice the entire surface from one
tower to the next. Here is the drawing of a tower with turret
stories and one battlement story, like the most of those that
flank the internal angles of the city of Carcassonne on the
southern side.

Have the footings or slope this tower with diameter of 13.7
ft. and walls of 2.3 to 2.7 ft. around the circumference A B
is traced the circular arc C D; divided this arc into 19 equ-
al parts, c e, e f, f g, g h, etc., taking on the outside of
the tower the points o at 1.0 ft. from the face of the curta-
in, the external surface of this tower is divided into 8 equal
parts. Then from the points a, d, r, k etc., are drawn lines
passing through the division points of the circumference of
the tower. These lines give the openings of the slots pierced
in the three stories; the slots a belonging to the ground sto-
ry, b to the second and c to the third; the slots flanking

ft. by the construction of the niche, and is pierced by an o opening splayed inside and very narrow on the exterior, so as to cover the exterior by an angle of 35°. A lintel with a semicircle cut in it covers that opening, and a very steep slope terminates its lower part. The sketch A gives the plan of this slot, B is its section on a b, D is its inside elevation, and F is its external appearance. To give more range to the angle of fire, the lower part of the slot, which is only 2.4 ins. wide, is cut as indicated in the detail C; d being the plan, e the outer face of the section.

Note 1.p.386. Arts. Architecture militaire, Cremeau.

The method that served for drawing this bottom opening of the slot is this (2); A B being the internal opening of the slot; C D the opening desired to be given at the bottom, taking the points a b at a distance of 1.2 ins.; from those points a b are drawn the two lines a D, b C. Those notches were originally triangular' about the middle of the 13 th century they become square, as we shall show them at once. These slots are pierced alternately in the towers, i.e., they are not placed over each other, but solids over voids, so as to cover all points of the circumference. It was only in the 13 th century that men recognized in piercing the slots the use of a constant method, a very skilfully calculated mode of tracing. At that epoch slots exactly flanked the curtains at their bases and summits, so as to enfilade the entire surface from one tower to the next. Here is the drawing of a tower with three stories and the battlement story, like the most of those that flank the internal enclosure of the city of Carcassonne on th the southern side.

Above the footings or slope this tower with diameter of 19.7 ft. and walls of 3.9 to 7.2 ft. around the circumference A B is traced the circular arc C D; dividing this arc into 16 equal parts, o e, e f, f g, g h, etc., taking on the outside of the tower the points p at 1.0 ft. from the face of the curtain, the external surface of this tower is divided into 8 equal parts. Then from the points e, g, i, k etc., are drawn lines passing through the division points of the circumference of the tower. These lines gave the openings of the slots pierced in the three stories; the slots a belonging to the ground story, b to the second and c to the third; the slots flanking

the curtains being thus located in middle. Then all points of the circular arc C C are seen, and cover the arrows across a base other. Let us add the upper interpretive diagrams to these slots to command the foot of the tower (left. Board), and this work is entirely defended, the curtains are erflated by these slots on each flank, two over each other in the ground and 1 third stories, and the tower a little in front.

The slots of works of small dimensions have no internal ar-cass; they are only repeer in a wide sulay. Ta reproduce (1) one of these. I gives their plan, B basic section on the axis and C basic internal elevation. The lower end of the slot is widened to extend the range of fire by means of a square notch, whose length is defined at C (internal elevation) and at B (section). It is here given an internal perspective view of this sort of slot, adopted from 1770 to about 1790.

In the important works of the city of Carcassonne, the slots that pierce the towers and curtains built under Philip the Fair possess rigoes quite similar to those of the casties of the 13 th century. But when the walls are higher, these mis-ses are surrounded by round arches, and their walls are furni-shed with stone benches. Fere (4) is one of the slots of the tower called la Trésa. At A we give the plan; at B the perspe-tive on the axis; at C the internal elevation, and at D an in-ternal perspective view. These dimensions seem to have been realized, for they are similar in all ways of the same proc. The installation of fire and consequently the lengths of the slots are modified according to the position of the slot with respect to the external fronts. These modifications being all directed to the same circumference at a given distance from the foot of the tower, as indicated in Fig. 5.

These arrangements are claimed with these slots, nevertheless in the different stories of the towers well as the rear of the curtains, care rather made to overall the outer cover to are constructed outside, than for defence. It is certain that these lower slots facilitated the operations of the archers, but it is inconceivable to think that they did not serve the de-fense. The lower opening alone can widens the angle of fire demonstrates their function. We have suggested to shoot towards these slots, not with a crossbow, which is as easy as with a musket, but with a bow. The sizes of the slot, instead of in-

the curtains being thus doubled in height. Then all points of the circular arc C D are seen, and beyond the arrows cross e each other. Let us add the upper defensive galleries to these slots to command the foot of the tower (Art. Hoard), and this work is entirely defended, the curtains are enfiladed by these slots on each flank, two over each other in the ground and t third stories, and the third a little in front.

The slots of works of small dimensions have no internal niches; they are only proper in a wide splay. We reproduce (4) one of these. A gives their plan, B their section on the axis and C their internal elevation. The lower end of the slot is widened to extend the range of fire by means of a square notch, whose detail is sketched at D (external elevation) and at E (section). At F we have given an internal perspective view of this sort of slot, adopted from 1250 to about 1350.

In the important works of the city of Carcassonne, the slots t that pierce the towers and curtains built under Philip the B Bold possess niches quite similar to those of the castles of the 12 th century. But then the walls are thicker; these niches are surmounted by round arches, and their walls are furnished with stone benches. Here (5) is one of the slots of the tower called de Tresau. At A we give the plan; at B the section on the axis; at C the internal elevation, and at D an internal perspective view. These dimensions seem to have been regulated, for they are similar in all works of the same epoch. The inclination of fire and consequently the length of the s slot are modified according to the position of the slot with regard to the external ground, these inclinations being all directed to the same circumference at a given distance from the foot of the tower, as indicated in Fig. 3.

Some archaeologists have claimed that these slots, pierced in the different stories of the towers and at the base of t the curtains, were rather made to permit one under cover to see what passed outside, than for defense. It is certain that these long slots facilitated the oversight of the exterior, but it is impossible to admit that they did not serve for defense. The lower opening alone that widens the angle of fire demonstrates their function. We have attempted to shoot through these slots, not with a crossbow, which is as easy as with a musket, but with a bow; the sides of the slot, instead of in-

lighting the fire, light the office of a mirror and so take a cursory case it more certain, than if one was subject to the open air. Further, the lamps of the if is and it is sometimes frequently another place also for reason, another a not lighting. One will note, that when the only a dome mirrors as in the preceding example, the overhangs have always made bonne air-holes, which allow the author to account the several surface, which translates by no such as depth of the spray.

Tel lamps arise very across behrens from the perpendicular of the if is cursory, those quite more also were only reason f for vacuum the exterior lamp to offer a means of tableau. at the lamp face of the city of Tony, whose construction is- ges from about (12). the two great lamps are arrayed by ple- ts whose small angle of convex and extreme depth, could only give a view of the point, also light and air in the interior of the hall. Here (6) is one of those slots.

At A we have traced the plan; at B the section, at C the in- ternal elevation. Here the convexities formed to weaken the walls by deep niches, and has given to the spaces of the slot only a very small angle of contact. The slots are not wrought at bottom and extend the full of fire, but slanted when the slots are very high above the floor, their inclination is not great. This sort of slots can then be repeated only as occasi- ons on the exterior and inlets for light and air. The niches have no bottom, which is clear in intention of their use not for tableau. For arrangement that a machine or a tableau- is placed inside tower and painting, there is then the ceil- ne beam. The projection D supports the floor.

We have assert that about the end of the 16 century, are remarkable slots inserted in the lower stories of towers not a curtains. Indeed at that epoch the art of the street was quite perfected, and that these lamp slots indicate architecturally the weak points of the structure. By lighting a slot between two of these slots, one would be almost certain to cause a part of the wall to fail. The advantage derived was from diminut the lower slots did not correspond for the lamps that they overcomed for the weighted. Then were established terrace defensive galleries or machicolations at the base of towers and curtains, with battlements and slots inserted at the middle

injuring the fire, fulfil the office of a mirror and on the c contrary make it more certain, than if one saw the object in the open air. Further, the texts of the 12 th and 13 th centuries frequently mention these slots for casting, shooting a and defending. One will note, that when the walls have a great thickness as in the preceding example, the constructors have always made those wide niches, which allow the archer to approach the external surface, which diminishes by so much the depth of the splay.

Yet there exist very strong defenses from the beginning of the 13 th century, whose quite rare slots were made rather f for watching the exterior than to offer a means of defense. A At the Laon gate of the city of Coucy, whose construction dates from about 1210, the two great towers are pierced by slots whose small angle of opening and extreme depth, could only give a view of one point, also light and air in the interior of the halls. Here (6) is one of those slots.

At A we have traced the plan; at B the section, at C the internal elevation. Here the constructor feared to weaken the walls by deep niches, and has given to the splays of the slot only a very small angle of opening. The slots are not widened at bottom and extend the range of fire, and although these sl slots are ver high above the ditch, their inclination is not great. This sort of slots can then be regarded only as outlooks on the exterior and inlets for light and air. The niches have no benches, which is again an indication of their use not for defense, for everywhere that a sentinel or a defender is placed inside towers and buildings, there is found the stone bench. The projection D supports the floor.

We have stated that about the end of the 14 th century, men renounced slots pierced in the lower stories of towers and c curtains. Indeed at that epoch the art of the miner was quite perfected, and that these long slots indicated externally the weak points of the structure. By digging a mine between two of these slots, one would be almost certain to cause a part of the wall to fall. The advantage derived then from piercing the lower slots did not compensate for the dangers that they presented for the besieged. Then were established permanent defensive galleries or machicolations at the tops of towers and curtains, with battlements and slots pierced at the middle

of the wrecks. The inner construction remained entirely unlike ships, tight and seaworthy, and correspondingly much more suitable to resist sag or mishap.

Then the ships are only found at the bows of the Gaffarens or at certain points where auxiliaries were placed, for example over the fuselage and vertic fins. In wreckage, at bows sides of the vertichlis, etc. From the middle of the 1st century the ships in the exterior only consist of a single covering or skin on a certain extent, the skin is often assigned at the middle by a sole frames a part of crews, as indicated in Fig. 7.

Note 1.p.395. From the reports of Antinon.

Naturally, the exterior area imposed the form of these ships. From the 1st to the middle of the 1st century in France, only the crossbow was employed as a hand arm for assault. The crossbow is an excellent arm for direct shooting; it has the qualities of the weapon, crossbow the range. Crossbows were little employed by the Italian armies of the royal Gaul. In the centurye in the Gaul, in Flanders and England, they formed considerable bodies and had acquired, as we have experienced for days at Trier, a marked superiority over the crossbow men, because of the rapidity of assessing with the bow and the effectiveness range of the crews. But in battle these weapons meet in the air rather than point blank, and for whoever the practised assessing with the bow, it is easy to accumulate the effects of unusual in bowman. After describing a bowman, when the arrow falls vertically it is a terrible crossbow, since the range crossbow escapes from it. A wrestlers in arrows arrow easily assile an arrow obliquely to a height of 121 to 169 ft., remains the end of its flight, it describes an almost parabola,and falling vertically from that height, it pierces a plate 1.9 inc. thick. Instead of arrowing also for associate directly with crossbow and only from the bow instead. They are so made that arrows can shoot in the air, either by an intermediate bowing a (Fig. 7), or by an upper opening b. This (b) the crossbow man or the archer could send the arrow directly, and the archer alone could shoot the arrow through the middle opening, or through the upper opening the arrow c. Teaching crossbow by wrestle avoided the projectiles with difficulty, but could not protect themselves from the projectiles". The necessity of leaving the inner parts

of the merlons. The lower construction remained entirely solid with slopes, thick and homogeneous, and consequently much more suitable to resist sap or mining.

Then the slots are only found at the tops of the defenses or at certain points where sentinels were placed, for example over the gates and beside them, in passager, at both sides of the portcullis, etc. From the middle of the 14 th century the slots on the exterior only consist of a simple opening or with a bottom notch, the slot is often enlarged at its middle by a hole forming a sort of cross, as indicated in Fig. 7.[1]

Note 1.p.398. From the remparts of Aviignon.

Naturally, the shooting arms imposed the form of these slots. From the 15 th to the middle of the 14 th century in France, only the crossbow was employed as a hand arm for shooting. N Now the crossbow is an excellent arm for direct shooting; it has the qualities of the musket, except its range. Archers were little employed by the feudal armies of the royal domain. On the contrary in the North, in Flanders and England, they formed considerable bodies and had acquired, as we have experienced too much at Crecy, a marked superiority over the crossbow men, because of the rapidity of shooting with the bow and the extraordinary range of the arrows. But in battle these archers shot in the air rather than point blank, and for whoever has practised shooting with the bow, it is easy to appreciate the effects of shooting in the air. After describing a parabola, when the arrow falls vertically it is a terrible projectile, since one cannot protect himself from it. A moderately expert archer easily sends an arrow obliquely to a height of 131 to 164 ft.; reaching the end of its flight, it describes an abrupt parabola,and falling vertically from that height, it pierces a plank 1.2 ins. thick. Instead of arranging slots for shooting directly with crossbows and only from the top downward, they are so made that archers can shoot in the air, either by an intermediate opening a (Fig. 7), or by an upper opening b. Thus (8) the crossbow men or the archer could send the arrow directly, and the archer alone could shoot the arrow B through the middle opening, or through the upper opening the arrow c. Besiegers protected by mantlets avoided the projectiles B with difficulty, but could not protect themselves from the projectiles C. The necessity of leaving the lower parts

of towers and curtains entirely alone to defend Paris and a mud alcove, and the frenzied use of aircraft from the middle of the 19 to century for the defense as well as for the attack, caused sieges to be neglected at the hon of the fortress and had to wintering been so indicated by fig. 7. Taken in Chinese, Saine, Orleans, and the Loire, that these cross sieges occurred at first, i.e., in provinces been occupied by the Indian armies, in part composed of aircraft. In the wells of Avignon, that date from the middle of the 19 to century, as likewise are cross sieges, but the Popes of Avignon had only mercenary troops, and many times were aircraft recruited in Auvergne and and Dauphiny.

This mode of sieges is found everywhere in France from the 19 to century. Their form was definitely adopted as the best, because allowed shooting direct or in the air. Artillery then came to mostly were the form of the sieges. They were only composed of round sieges for cutting the wrecks of the market vi-ta a street cooking stove (3). Fortresses these sieges are found with a horizontal slot between them. Here is one of those si-ges taken from the western part of Angelsheim.(10). The will note that these holes are pierced in a quite thin slab set f flank with the exterior of the wall of fortress and surrounded by a recess in the masonry inside. A market call coming from outside right wall break the slab. This slot is pierced beca-te the fate and towards the road descending toward the vill-ate; this explains its height above the ground inside. At a the side is crossed on the exterior; at f the interior, and at f in section. Let the rapid progress made by artillery in the 19 to century greatly perplexed military constructors. They changed with difficulty the old system, and opposed to the effects of the new projectiles obstacles almost always in-sufficient. It was only at the end of the century, that the engineers or architects arrived actual lodgmies for musketry, and about these may be cited as particularly interesting, ta-ne of the Bastion built before the Iron gate at Dolay. This fortion today in great part is covered by the imperial road, about the plateau and enlighted the ditches of the city by a kind of lodgmies and small strongrees. It must have been a sufficiently very strong.

Taken about the last years of the 19 th century, if one re-fers it to the wars sculptures and monuments, that increase

of towers and curtains entirely plain to better resist sap a and mining, and the frequent use of archers from the middle of the 14 th century for the defense as well as for the attack, caused slots to be pierced at the top of the defenses and led to widening them as indicated by Fig. 7. Indeed in Guienne, Maine, Poitou, and the North, that these cross slots appeared at first, i.e., in provinces then occupied by the English armies, in part composed of archers. In the walls of Avignon, that date from the middle of the 14 th century, we likewise see cross slots; but the Popes of Avignon had only mercenary troops, and among them were archers recruited in Switzerland and Dauphiny.

This sort of slots is found everywhere in France from the 15 th century; their form was definitely adopted as the best, because allowing shooting direct or in the air. Artillery then came to modify anew the form of the slots. They were only composed of round holes for passiug the muzzle of the musket with a sight opening above (9). Sometimes these holes are double with a horizontal slot between them. Here is one of those slots taken from the eastern gate of Angelsheim.(10). One will note that these holes are pierced in a quite thin slab set flush with the exterior of the wall of defense and surrounded by a recess in the masonry inside. A musket ball coming from outside might well break the slab. This slot is pierced beside the gate and commands the road descending toward the village; this explains its height above the ground inside. At A the slot is presented on the exterior; at B the interior, and at C in section. But the rapid progress made by artillery in the 15 th century greatly perplexed military constructors. They abandoned with difficulty the old system, and opposed to the effects of the new projectiles obstacles almost always insufficient. It was only at the end of the century, that these engineers or architects arrauged actual loopholes for musketry, and among these may be cited as particularly interesting, those of the bastion built before the Laon gate at Coucy. This bastion today in great part is covered by the imperial road, swept the plateau and enfiladed the ditches of the city by means of loopholes and small embrasures. It must have been erected about the last years of the 15 th century, if one refers it to the same sculptures and mouldings, that decorate

a subterranean work pierced by

the valley of the mediterranean story.

This bastion, whose entirety is given at C (ii), has at its base at about 5.7 ft. above the bottom of the ditch, the gallery covered by a round tunnel vault 5.0 ft. wide. A wooden parapet protected arches in corbelled bricks the salient. The galleries are pierced at close distances by slits arranged so as to cross the enemy fire at the bottom of the ditch, as indicated by the dotted lines at F. At C we have given the plan of the character of the salient with its two slots a and its vertex b pierced in the vault; at D is the plan of one of these slots on the front, which are located in the point of the surface. At E are also vents. The section E is made on a f; at D on a g, and at E on i k. These galleries are pierced by numerous slots, and are evidently intended to prevent the work of the sap and the mine at the foot of the bastion. All this construction is executed with great care and is perfectly preserved. In article Torre we shall explain in more detail the utility of this work, so interesting by its date and so complete.

DESCRIPTION. Vessels. Late Bast.

A little corbel arranged towards the movable seat of a stall, serving as a seat, and containing the religious to sit on it when the seat is raised, while appearing to stand.(art. Stalls).

Gargoyle. Gutter Gas.

The cap of a chimney flue intended to prevent the rain or wind from entering the flue while allowing the smoke to escape. During the middle ages the caps were made of terra cotta, brick or stone. Perhaps some ironwork from ones exhaled, but we have found none in place, although sometimes remaining at tops of chimney flues indicated the presence of an iron cap.

There still exists in the hospital of Sens a beautiful cap of glazed terra cotta, that appears to date from the 15th century. Here (1) is a sketch of it. This cap is in form of a triple ville and allows the smoke to escape by three vertical openings, four lateral holes and four ends. The arrangement of these exits was well made to prevent the wind from entering the flue. As A we give the horizontal projection of that

the vaults of the subterranean story.

This bastion, whose entirety is given at A (11), has at its base at about 3.3 ft. above the bottom of the ditch, the gallery covered by a round tunnel vault 3.9 ft. wide. A chamber vaulted by pointed arches is constructed behind the salient. The galleries are pierced at close distances by slots arranged so as to cross the musketry fire at the bottom of the ditch, as indicated by the dotted lines at B. At C we have drawn the plan of the chamber of the salient with its two slots a and its vents b pierced in the vault; at D is the plan of one of these slots on the front, which are doubled in the height of the surface. At d are also vents. The section E is made on e f; at G on g h, and at H on i k. These galleries are pierced by numerous slots, and are evidently intended to prevent the work of the sap and the mine at the foot of the bastion. All this construction is executed with great care and is perfectly preserved. In Article Porte we shall explain in more detail the utility of this work, so interesting by its date and so complete.

MISERICORDE. Miserere. Edge seat.

A little corbel arranged beneath the movable seat of a stall, serving as a seat, and permitting the religious to sit on it when the seat is raised, while appearing to stand.(Art. Stalle).

MITRE. Chimney Cap.

The cap of a chimney flue intended to prevent the rain or wind from entering the flue while allowing the smoke to escape. During the middle ages the caps were made of terra cotta, brick or stone. Perhaps some wrought iron ones existed, but we have found none in place, although sometimes fastenings remaining at tops of chamney flues indicated the presence of an iron cap.

There still exists in the hospital of Sens a beautiful cap of glazed terra cotta, that appears ts date from the 13 th c centurw. Here (1) is a sketch of it. This cap is in form of a ridge tile and allows the smoke to escape by three vertical openings, four lateral holes and both ends. The arrangement of these exits was well made to prevent the wind from entering the flue. At A we give the horizontal projection of that

cap. At C its cross section, and at D its side. The projections
posterior are lightly cylindrical are covered by a layer of the
tissue in the modified while it was still fresh and after the
fixing of the cylinders on the top of the right side. However
at that moment primary fibres partially cover in cylinders and
the case then took the conical form. One of those conical caps
of clayey terra cotta has still been more years since on a b
house of the it in country attached to the western side of t
the city of Saint-de-Jonois (D). It A is traced its horizontal
projection and at C its elevation. Rome, Troyes, Villeneuve-
sur-Yonne, still possess some remains of those old chimney cap
of terra cotta. But in provinces where the stone is resistant
and easily procurable, the flues almost always have case belong-
ing to the construction, and the materials of those flues are
actual case. Lyonnais in the provinces where brick was used
during the middle ages, the caps are made by means of combin-
ing tiles and bricks (Art. Cheminee). The architects of the a
middle ages always sought to decorate the parts of the construc-
tion relieved against the sky and to give them a pleasing
outline. In windows of mediaeval of the 15 in century are
seen chimney caps richly ornamented; but unfortunately the f
fragility of these materials of public and private edifices, w
very exposed to storms, has caused their destruction in all
our old cities.

During the period of the Renaissance very beautiful caps of
fired terra cotta and even of faience were still made. These
faience caps are composed of several round parts fitting on
each other, and sometimes curiously ornamented by delicate f
tessels in relief or painted, too small in scale indeed for
the places they occupy. But then the true feeling of the exte-
rnal decoration of edifices was greatly changed, and these c
caps of fine pottery, very pretty in the closeness to a manner,
produced no effect on the top of a roof.

CONCLUSION. Remarks.

Pieces of small sizes and low in price supplied by the ma-
nufactures for building walls with mortar or plaster. Tubule is
pointed or round. Pointed tubule presents a pressed surface,
resistanted and that does not require to be glazeted. Round
tubule has no regular form, i.e., it has neither back nor face.

cap, at B its cross section, and at C its side. The projections bordering the little cylinders are obtained by a stroke of the thumb in the moulding while it was still fresh and after the fixing of the cylinders on the top of the ridge tile. However at that epoch chimney flues habitually ended in cylinders and the caps then took the conical form. One of those conical caps of glazed terra cotta was still seen some years since on a h house of the 14 th century attached to the eastern gate of t the city of Semur-en-Auxois (2). At A is traced its horizontal projection and at B its elevation. Sens, Troyes, Villeneuve-sur-Yonne, still possess some remains of those old chamney caps of terra cotta. But in provinces where the stone is resistant and easily wrought, the flues almost always have caps belonging to the construction, and the capitals of those flues are actual caps. Likewise in the provinces where brick was used during the middle ages, the caps are made by means of combining tiles and bricks (Art. Cheminee). The architects of the m middle ages always sought to decorate the parts of the construction relieved against the sky and to give them a pleasing outline. In vignettes of manuscripts of the 15 th century are seen chimney caps richly ornamented; but unfortunately the f fragility of these details of public and private edifices, w very exposed to storms, has caused their destruction in all our old cities.

During the period of the Renaissance very beautiful caps of glazed terra cotta and even of faience were still made. Those faience caps are composed of several round parts fitting on each other, and sometimes curiously ornamented by delicate d details in relief or painted, too small in scale indeed for the places they occupy. But then the true feeling of the external decoration of edifices was greatly changed, and those c caps of fine pottery, very pretty to see closely in a museum, produced no effect on the top of a roof.

MOELLON. Rubble.

Stones of small sizes and low in height supplied by the quarries for building walls with mortar or plaster. Rubble is pointed or rough. Pointed rubble presents a dressed surface, rusticated and that does not require to be plastered. Rough rubble has no regular form, i.e., it has neither beds nor face.

-tinted marble was much used in the middle ages in the construction of houses and of edifices erected at small cost, and this sort of structure are admirable, because their surfaces are perfectly connected with the internal rough masonry. In some provinces of France and notably in Burgundy and Dauphiné are several large beds of limestone, hard and compact, but quite in very thin layers of 0.2 to 0.3 ins., and regular, which thus furnish excellent coloured marble, only requiring a very slight preliminary dressing. Thus in those provinces are seen many old monuments whose surfaces are faced with polished marble presenting a surface as clear as that of cut stone. Between the buttresses the walls of the naves of the cathedrals of Tarsday, Poitiers and Tours are faced with coloured marble admirably preserved. Transportation being then difficult, the undertakers may the quarrymen could more easily obtain coloured marble, which they brought on the back of an ass if necessary, then cut it. They preferred the ladder for columns, angles, piers, buttresses, pilasters, cornices and window sills.

The Romans frequently employed polished marble, but in place of presenting square surfaces cut-vertically and not horizontally. This tradition was followed in certain provinces of France until the 12 th century. Thus the nave of the cathedral of Tours, for example, whose construction dates in the 11 th century, presents external surfaces that have all the appearance of a roman structure. In the towns of the Meuse and of the Loire are seen a number of edifices of the 11 th and 12 th centuries, that offer the same regularity. Nevertheless and a part of Italy still retain numerous remains of structures of the 11 th century. The one could believe were built by roman masons.

CHAPTER. Horseshoe.

A also sufficiently wide to allow mounting a horse without the aid of the stirrup. There was use a mount of a castle, a mansion or the without one or more horseshoes. They were for women and men, and the fitters of these last play also an important part in the habitations of the lords were accompanied by horseshoes. Horses and mules were required to go to the horseblock, i.e., were dressed sufficiently near this stone

Pointed rubble was much used in the middle ages in the construction of houses and of edifices erected at small cost, and this sort of structures are excellent, because their surfaces are perfectly connected with the internal rough masonry. In s some provinces of France and notably in Burgundy and Charolais are several large beds of limestone, hard and compact, that splits in very thin layers of 3.9 to 7.9 ins., and regular, which thus furnish excellent pointed rubble, only requiring a very slight preliminary dressing. Thus in those provinces are seen many old monuments whose surfaces are faced with pointed rubble presenting a surface as plane as that of cut stone. Between the buttresses the walls of the naves of the churches of Vezelay, Pontigny and Beaune are faced with pointed rubble admirably preserved. Transportation being then difficult, one understands why the constructors could more easily o obtain pointed rubble, which they brought on the back of an ass if necessary, than cut stone. They reserved the latter for columns, angles, piers, buttresses, plinths, cornices and window sills.

The Romans frequently employed pointed rubble, but in pieces presenting square surfaces externally ind not rectangular. T This tradition was followed in certain provinces of France u until the 12 th century. Thus the nave of the cathedral of Mans, for example, whose construction dates in the 11 th century, presents external surfaces that have all the appearance of a Roman structure. On the banks of the Mayenne and of the Loire are seen a number of edifices of the 11 th and 12 th c centuries, that offer the same peculiarity. Beauvoisois and a part of Valois still retain numerous remains of structures of the 11 th century, tha one could believe were built by Roman masons.

MONTOIR. Horseblock.

A step sufficiently high to allow mounting a horse without the aid of the stirrup. There was not a court of a castle, m mansion or inn without one or more horseblocks. They were for women and men, and the flights of steps that play such an important part in the habitations of the lords were accompanied by horseblocks. Horses and mules were prepared to go to the horseblock, i.e., were brought sufficiently near those steps

that the rider could easily place himself in the saddle. A horse that would not do to the block was reported vicious. One understands that for a man heavily armed the horseblock was a necessity, and without the block the rider could scarcely mount his horse at that moment when armor had a very considerable weight.

There was at the Tower of Charles V a block for the king and one for his queen. We have seen one of those horseblocks (1) in the court of mission in la Prevoslie at Paris, placed beside the rear Tower beside the flight of steps. This block was cut in a single block of stone and consisted of three steps, the last forming a little landing.

The flight of steps at the castle of Pierrefonds was accompanied at right and left of the principal flight by two large horseblocks (fig. Barron). Before the inns was always outside a stone horseblock, and in the court were several wooden blocks, a sort of stool that was moved at need. The blocks were decorated by tapestry on days of ceremony in castles of Paris. At the side of the flight during the tournaments were placed horseblocks for the commoners, and then to place one's self in the saddle without the aid of the block was regarded as an act of valor.

MORTAIRE. Mortars.

A term of carpentry and joinery. The mortise is the cavity that receives the tenon. (Fig. Chambrée, Menuiserie, Tenon).

MORTIER. Mortar.

Composed of sand and lime. To make good mortar river sand or gravel was then accounted as the best. Lastness was a quality of the best of lime slain or air, that sand is always mixed with a certain quantity of clay, and does not fulfil the conditions necessary for making good mortar.

During the middle ages mortars are of very different qualities, consisting sand and mixed as in Roman structures, examples of medioere quality in the V ra, 10 th and 11 th centuries. It seems that one can see into the procedures of ancient lime, and it is not exceptionally true the lines in our building of that period express efficient a certain consideration. In the 12 th century, mortars consisted of reason alternation lar-

that the rider could easily place himself in the saddle. A horse that would not go to the block was reputed vicious. One understands that for a man heavily armed the horseblock was a necessity, and without the block the rider could scarcely bestride his horse at that epoch when armor had a very considerable weight.

There was at the Louvre of Charles V a block for the king and one for the queen. We have seen one of those horseblocks (1) in the court of mansion de la Tremoille at Paris, placed beside the rear facade beside the flight of steps. This block was cut in a single block of stone and consisted of three steps, the last forming a little landing.

The flight of steps at the castle of Pierrefonds was accompanied at right and left of the principal flight by two large horseblocks (Art. Perron). Before the inns was always outside a stone horseblock, and in the court were several wooden blocks, a sort of stool that was moved at need. The blocks were decorated by tapestry on days of ceremony in castles of Paris. At the ends of the lists during the tourneys were placed horseblocks for the combatants, and then to place one's self in the saddle without the aid of the block was regarded as an act of vigor.

MORTAISE. Mortise.

A term of carpentry and joinery. The mostise is the cavity that receives the tenon. (Arts. Charpente, Menuiserie, Tenon).

MORTIER. Mortar.

Composed of sand and lime. To make good mortar river sand or gravel has been recognized as the best. Whatever the quality of the sand of the plain or pit, that sand is always mixed with a certain quantity of clay, and does not fulfil the conditions necessary for making good mortar.

During the middle ages mortars are of very different qualities, sometimes hard and compact as in Roman structures, sometimes of mediocre quality in the 9 th, 10 th and 11 th centuries. It seems that men had then lost the procedures of making lime, and it is but exceptionally that one finds in the edifices of that epoch mortars offering a certain consistency. In the 12 th century, mortars commenced to resume strength; dur-

[illegible] in Ia, Ib and IC in centuries, specialist searches are more [illegible].

The quality of the mortar is then one of the basic criteria by archaeologists for recognizing the date of an edifice, but it is more characteristic [illegible] stone, mortar replaced in Romanesque monuments preceding the IA in country in accordance with [illegible] of tiles, especially during the IC in country and mortars in IB [illegible], i.e., contains little lime, and tend to yellow [illegible]. In the IC in country are found in Ile-de-France, Champagne and Burgundy, mortars composed of fine gravel (often [illegible] sand) and lime in quantity, but really [illegible] and [illegible], having no strength. The rule of tiles have disappeared. In the IB in country, particularly in the [illegible] half, mortars are mixture, still made with fine sand, sometimes composed with [illegible] and gilded. Often the end of the IC in country mortars [illegible] very poor and are of two kinds. The mortar of concrete is made of very coarse gravel, that of the joints and [illegible] with good river sand, fine and [illegible]. The lime used for the [illegible] and joints is quicker than of the concrete, which is made mixed with [illegible]. During the IA in the end IC in centuries frequently employed plaster sand, very [illegible] gravel; the mortars are frequently [illegible] lime [illegible] and slaked. But even the plaster sand employed seems to have been washed, for it contains no clay. Only in certain parts of Picardy the stopy sand was used without washing in Saint Acheul, and although these mortars may have acquired hardness, they have always crackers in the concrete and to not present a perfectly compact mass.

Characteristics have employed the lime soon as could be furnished by the limestones at hand. These lines are hydraulic in provinces where the limestone possesses that quality, for in provinces where the limestone contains very little clay. Consequently they were [illegible] with artificial hydraulic lime. But from the end of the IC in century for lines had become [illegible] very great hardness, even in foundations, as we have recognized in the substructures of the cathedrals of Reims, Amiens, Paris, Tours, etc.

It must be added that at that moment, i.e., at the beginning of the IA in century, reasons of economy essentially commercial compelled to use but very little lime in their mortar and

during the 13 th, 14 th and 15 th centuries, excellent mortars were made.

The quality of the mortar is then one of the means furnished to architects for recognizing the date of an edifice, but it is more characteristic than other signs. Mortar employed in Romanesque monuments preceding the 12 th century is sometimes mixed with bits of tiles, especially during the 10 th century and earlier; it is lean, i.e., contains little lime, and that is badly burned. In the 11 th century are found in Ile-de-France, Champagne and Burgundy, mortars composed of fine gravel (often plains sand) and lime in quantity, but badly burned a and drowned, having no strength. The bits of tiles have disappeared. In the 12 th century, particularly in the second half, mortars are uniform, well made with fine sand, sometimes chosen with care and sifted. After the end of the 12 th century mortars generally become very good and are of two kinds. The mortar of concrete is made of very coarse gravel, that of the joints and beds with good river sand, fine and pure. The lime used for the beds and joints is whiter than that of the concrete, which is much mixed with bits of charcoal. During the 14 th and 15 th centuries is frequently employed plains sand, v very rarely coarse gravel; the mortars are frequently mixed, the lime well burned and slaked. But then the plains saud employed seems to have been washed, for it contains no clay. Only in certaiu parts of Picardy the clayey sand was used without washing in making mortar, and although these mortars may have acquired hardness, they have always cracked in the concrete and do not present a perfectly compact mass.

Constructors have employed the lime such as could be furnished by the limestones at hand. These limes are hydraulic in provinces where the limestone possesses that quality, fat in provinces where the limestone contains very little clay. Consequently they were not acquainted with artificial hydraulic lime. But from the end of the 12 th century their fat limes had acquired very great hardness, even in foundations, as we have recognized in the substructures of the cathedrals of Rheims, Amiens, Paris, Sens, etc.

It must be stated that at that epoch, i.e., at the beginning of the 13 th century, reasons of economy sometimes compelled constructors to use but very little lime in their mortar and

the most so very local it. The workers in the construction of the materials of Lora, Tyre, Saidon-Sur-Mere and Tser a are very few. But as here given elsewhere the reasons, that cause these utilities to be erected with extreme economy (Ibid. Essentials, Construction).

MORTAR. MOSAIC.

Thus bits of little cones of hard stone or of glass pastes of different colors, fixed on the surfaces of monuments or on floors by means of a cement composed of lime, very fine sand, particles of powdered brick. The forms of the late Byzantine and Romanesque only for decorative floors of halls, but also for covering the walls. It is unnecessary to repeat here what has been written on this subject. It suffices for us to state that mosaic was very frequently used in the monuments of the Byzantine period in the East. Tradition of Tyre speaks of the masses that presented several churches of his time. T. Tailate, bishop of Ruscre in the 6 th century caused the erection of the chancery of J. Baptist. The apse of the church was decorated in mosaics into which gold entered for a great part.[1] Pilasters mosaic work, and walls was given the name of Byzantine, in consists of gold grounds assigned by means of little cones of pilled glass paste covered by transparent enamel. The sacred scenes and ornaments are designed on these golden grounds. Tesera work of mosaic is very common in Italy, Sicily and the Orient, but very rare in France, since we know only a single example still existing in the little church of Perigny-les-Fossés near Villy-sur-Loire, an example that appears to date from the 9 th century.

Rev. A.-Arch. Rue Lebeuf. Rev. Conc. Philat. etc. et Vendee. d'Auxerre. Vols I. p. 149.

Abbe Lebeuf, in his History on Diocese to Paris,[1] says that in the castle of Dioctre built by the Duke of Berry, brother of Charles V, there were two small rooms "enriched by perfectly beautiful work in mosaic." It is now difficult to form an idea of what this work could have been in mosaic of the 14 th century, since we know of no other work of the kind existed in France since the 17 th century. Yet we still possess in the churches of the Abbey church of S. Denis the remains of a mosaic pavement with gold ground and color dating from the

the sand as they found it. The mortars in the construction of the cathedrals of Laon, Troyes, Chalons-sur-marne and Seez a are very bad. But we have given elsewhere the reasons, that caused those edifices to be erected with extreme economy. (Arts. Cathedrale, Construction).

MOSAIQUE. Mosaic.

Works made of little cubes of hard stone or of glass pastes of different colors, fixed on the surfaces of monuments or on floors by means of a cement composed of lime, very fine sand, pozzolana or pounded brick. The Romans of the late time employed mosaic not only for decorating floors of halls, but also for covering the walls. It is unnecessary to repeat here what has been written on this subject. It suffices for us to state that mosaic was very frequently used in the monuments of the M Merovingian epoch in the West. Gregory of Tours speaks of the mosaics that ornamented several churches of his time. S. Pallade, bishop of Auxerre in the 6 th century caused the erection of the monastery of S. Eusebe, the apse of the church was decorated by mosaics into which gold entered for a great part.[1] Indeed mosaic work, and which was given the name of Byzantine, is composed of gold grounds obtained by means of little cubes of gilded glass paste covered by transparent enamel. The subjects and ornaments are detached on these golden grounds. This sort of mosaic is very common in Italy, Sicily and the Orient, but very rare in France, since we know only a single example still existing in the little church of Germigny-les-Pres near Sully-sur-Loire, an example that appears to date from the 9 th century.

Note 1.p.403. Abbe Lebeuf. Mem. conc. l'hist. civ. et eccles. d'Auxerre. Vol. I. p. 149.

Abbe Lebeuf, in his Histoire du diocese du Paris,[1] says that in the castle of Bicetre built by the duke of Berry, brother of Charles V, there were two small rooms "enriched by perfectly beautiful work in mosaic." It is now difficult to form an idea of what this work could have been in mosaic of the 14 th century, since we know of no other work of the kind executed in France since the 12 th century. Yet we still possess in t the storerooms of the abbey church of S. Denis the remains of a mosiac pavement with gold ground and color dating from the

ent of the 12 th century, and that certainly recalls in many-
sphere the Italian mosaics of the same epoch. This conversion,
whose entirely is observed by a drawing by Percier made in
1797, represents the labors of the year accompanying a large
representment composed of fantastical animals. If the fabrication
is Italian, the design is evidently French. But it should not
be forgotten that Paris, if we believe his note, had invited
artists from all countries to contribute to the erection of t
the new palace, begun in 1180. However, we cannot give to the
cartoons, that served for the execution of the work, a late
remaining 1180.[1] In returning from this mere course of 7. Den-
is the and excavations that so orchestrally managed its centre-
ter, we found under the water this floors a number of little
pieces of glazed terra cotta 0.6 to 0.7 in. square, that evid-
ently served for making mosaics by an economical processes. In
the 12 th century we architecture consists sometimes to initiate
those Italian floors known by the name of opus alexandrinum;
but the pard stones being making for them, they replaced them-
as by glazed terra cotta. Here concerning the this floors of t
terra cotta had inlaid drawings, or inclosed stone slabs repla-
ced with as the old Gallo-Roman mosaics, or those of beyond
the mountains. In for mosaics on walls, as we have shown, t
there exist only a very limited number of them on this site
of the Alps, and those presents the 12 th century. Planned di-
rec was the true decoration of palaces in France from that
epoch, and in fact simpler glass is a sort of presumptuous co-
nic. (Art. Vitrail).

Note 1.p.104. Vol. X. p. 16.

*Note 2.p.104. There must be mentioned here the mosaic repre-
senting the figures of the months elaborated in 1231 at S. M-
ther, that came from the Cross of prince Kilkia, and that at
Arte in 1109 (abbey of S. Martin).*

VOTIER. VIII.

Only occasional carvings here with children contained a
machine for drinking, for fishing, or for making mosaic, we
have still never by a stream and wind mills. Water mills occ-
ur to us dubiel. Indeed, foreign about of S. Martin, cause-
d to be established permanent water mills, begin under Pilgrim
in 797. These mills according to the chronicle of the abbess-

end of the 12 th century, and that perfectly recalls in manufacture the Italian mosaics of the same epoch. This pavement, whose entirety is preserved by a drawing by Percier made in 1797, represented the labors of the year surrounding a large compartment ommupied by fanciful animals. If the fabrication be Italian, the design is evidently French. But it should not be forgotten that Suger, if we believe his acts, had invited artists from all countries to contribute to the erection of t the new church, begun in 1140. However, we cannot give to the cartoons, that served for the execution of the work, a date preceding 1190.[2] In removing from this same church of S. Denis the sad excrescences that so profoundly changed its character, we found under the modern tile floors a number of little cubes of glased terra cotta 0.6 to 0.8 in. square, that evidently served for making mosaics by an economical procedure. In the 12 th century we architects sometimes sought to imitate those Italian floors known by the name of opus Alexandrinum; but the hard stones being wanting for them, they replaced these by glazed terra cotta. More commonly the tile floors of t terra cotta had inlaid drawings, or incised stone slabs replaced with us the old Gallo-Roman mosaics, or those of beyond the mountains. As for mosaics on walls, as we have stated, t there exist only a very limited number of them on this side of the Alps, and those precede the 12 th century. Stained glass was the true decoration of edifices in France from that epoch, and in fact stained glass is a sort of translucent mosaic. (Art. Vitrail).

Note 1.p.404. Vol. X. p. 16.

Note 2.p.404. There must be mentioned here the mosaic representing the figures of the zodiac discovered in 1831 at S. Omer, that come from the tomb of prince William, who died at Aire in 1109 (abbey of S. Bertin).

MOULIN. Mill.

Only occupying ourselves here with buildings containing a machine for grinding, for fulling, or for shaping metals, we have mills moved by a stream and wind mills. Water mills appear to be oldest. lambert, fortieth abbot of S. Bertin, caused to be established permanent water mills, begun under Odland in 797. Those mills according to the chronicle of the abbots

of J. Durio were the first that were established in the coun-
try.[6] That model (Nader (b)J - 1111) even caused to be prac-
tical applied works, that answer to have been quite incorre-
ct, since by means of the water wheels of the money mills, he
elevated the water necessary for the service of the monastery,
as to distribute it in the buildings by water-pressure arra-
ngements. There is no mention of windmills in France before the
XII th century. Some authors claim that the invention of that
sort of mills was produced from the Orient by the first cruse-
ders; but latest historians were calling Turkish mills in Syria
many before the 12 th century. Charters of Philip August grant
the right of establishment windmills and water mills,[7] and in
the records of Order of Jerusalem.[8] There are two sections of
water mills.

Note 1.p.105. See Abbes de S. Berlin, etc., by M. H. De la Rue, part II. Caen, 1.21, 1777.

Note 2.p.107. In 1492. Cambrai. Turks. Italian notes.

Its French page.

Note 3.p.109. Paris 1777.

Note 5.p.105. Verse 2415.

The Cluny Rivers charters of parliament relating to the seigniorial
lawsuit of windmills. In small quote one of these charters, r
registered in 1275, under Philip III.

"The monks of Cluny-Priory complained that a windmill belonging
to Pierre of Jaulai had been recently erected near Paulai to
their prejudice and damage, and to the injury of their mills
of Jonzier; they requested that this mill should be destroyed,
when the alleged that the land had had or offered it by
inheritance. The reasons for opposing earlier having been heard,
the lawsuit was pronounced, the mill must not be destroyed, so
far as the monks are concerned."[9]

Note 6.p.105. See Olim. Vol. I.p.82.

In the 17 th century lord in Dauphiné, travelling at Grotes
and describing the utilities, that seemed to him remarkable in
that city, expressed himself thus:- "And all along that (wall
of the city) are placed 17 windmills, all in a row, that grind
night and day in winter and summer. Old French).[7]

Note 7.p.107. Voyage d'Antenner en Dauphiné, by de Chenaud. 1817. published by morpuis Le Grande. 1888.

In the towers of the water enclosure of the city of Grenoble-

of S. Bertin were the first that were established in the country.[1] That abbot Lambert (1095 - 1123) even caused to be executed hydraulic works, that appear to have been quite important, since by means of the motor wheels of the abbey mills, he elevated the water necessary for the service of the monastery, so as to distribute it in the buildings by subterranean aqueducts. There is no mention of windmills in France before the 12 th century. Some authors claim that the invention of that sort of mills was brought from the Orient by the first crusaders; and indeed windmills were called Turkish mills in Normandy during the 14 th century. Charters of Philip August grant the right of establishing windmills and water mills,[2] and in the romance of Ogier of Denmark,[3] there are two mentions of water mills.

Note 1.p.405. See Abbes de S. Bertin, etc., by M. H. De la Place. Part I. 1854. p. 41, 186, 187.

Note 2.p.405. In 1195. Duconge. Gloss. (Latin note).

Old French poem. [4,5]

Note 4.p.405. Verse 6673.

Note 5.p.405. Verse 8349.

The Olim gives decrees of parlement relating to the establishment of windmills. We shall quote one of these decrees, r rendered in 1275, under Philip III.

"The monks of Royaumont complained that a windmill belonging to Pierre of Baclai had been recently erected near Baclai to their prejudice and damage, and to the injury of their mills of Gonesse; they demanded that this mill should be destroyed, when the stated that the lord king had said or ordered it by judgment. The reasons for the opposing parties having been heard, the decree was pronounced, the mill must not be destroyed, so far as the monks are concerned."[6]

Note 6.p.405. Les Olim. Vol. I.p.62.

In the 15 th century lord de Caumont, traveling at Rhodes and describing the edifices, that seemed to him remarkable in that city, expressed himself thus:- "and all along that (wall of the city) are placed 16 windmills, all in a row, that grind night and day in winter and summer. Old French). [7]

Note 7.p.405. Voyage d'outremer en Jerusalem, by de Coumont. 1417. published by marquis La Grange. 1858.

On the towers of the enner enclosure of the city of Carcas-

Carcassonne, there were several watermills, as shown by a vis-
ncia of 1417,[1] and by the old names of some of those towers.[2]
Water mills belonging to nobles or isolated abbeys were oft-
en forbidden. The establishment of a mill could occur only by
a grant of the lord of the manor. In granting the right to
build a mill, the lord assigned to him an area, the ban of
the mill. All the inhabitants comprised within this ban were
called to have their grain ground in the mill of that area,
under pain of seeing their wheat, horse and cart confiscated
for the benefit of the owner of the mill of the lord of the
territory. Thus these mills became social fiefs, whose prese-
rvation was important to the lord that had permitted their
establishment, to the owner and to the inhabitants comprised
within the ban; it was necessary for these buildings to be a
ble to resist a sudden attack and to defend themselves. Ma-
ny they were built on islands as much as possible, or instead
on a bridge easily barricaded. These mills were sometimes sur-
ronded enough to contain a regular siege, and so that their mot-
or wheels could not be destroyed by stone-throwers or mangonels,
they were then carefully protected by a masonry structure. T
The mill called la Roi on the Aude at Carcassonne thus resis-
ted the attacks of the army of Trencavel in 1240. In his sco-
ldent work on Languedoc military, V. Leo Drouyn gives several
examples of water mills, most dated from mostly in the 14 th c
entury, and that many with what care these works were estab-
lished in the middle ages. The building containing the machin-
ism is nearly always square or rectangular in plan, the rotor
wheel being placed inside the length of one side of the paral-
lelogram. If no bills preceding the 12 th century exist, the M
ayrie as well as the reconstructions of those works can leave
us no doubts concerning their establishment from the beginning
of the 12 th century at least. One of the capitals of the nave
of Lesbiny shows us the machine of a mill. The man carrying g
rain to the hopper. The manuscript of Herrada of Landsberg,
that dates from the 12 th century, likewise shows us the mech-
anism of a water mill having a motor wheel with blades, whose
axle has a cogwheel and turns the lower millstone. From the
time of William the Conqueror, says V. L. Delisle, there had
been establishment at the entrance of the port of Dover a mill
moved by the flow of the tide. In 1127 one of these existed

Carcassonne, there were several windmills, as shown by a vignette of 1467,[1] and by the old names of some of those towers.[2] Water mills belonging to castles or isolated abbeys were often fortified. The establishment of a mill could occur only by a grant of the lord of the manor. In granting the right to b build a mill, the lord assigned to him an area, the ban of t the mill. All the inhabitants comprised within this ban were obliged to have their grain ground in the mill of that area, uder pain of seeing their wheat, horse and cart confiscated for the benefit of the owner of the mill of the lord of the delinquent. Thus these mills became actual fiefs, whose preservation was important to the lord that had permitted their establishment, to the owner and to the inhabitants comprised within the ban; it was necessary for these buildings to be a able to resist a sudden attack and to defend themselves. Hence they were built on islands as much as possible, or indeed on a bridge easily barricaded. These mills were sometimes strong enough to sustain a regular siege, and so that their motor wheels could not be destroyed by stone-throwers or mangonels, they were then carefully protected by a masonry structure. T The mill called du Roi on the Aude at Carcassonne thus resisthe the attacks of the army of Trencavel in 1240. In his excellent work on Guienne militaire, M. Leo Drouyn gives several examples of water mills, that date from mostly in the 14 th c century, and that show with what care these works were established in the middle ages. The building containing the mechanism is nearly always square or rectangular in plan, the motor wheel being placed inside the length of one side of the parallogram. If no mills preceding the 13 th century exist, the te texts as well as the representations of those works can leave us no doubts concerning their establishment from the beginning of the 12 th century at least. One of the capitals of the nave of Vezelay shows us the machine of a mill, the men carrying g grain to the hopper. The manuscript of Herrade of Landsberg,[3] that dates from the 12 th century, likewise shows us the mechanism of a water mill having a motor wheel with blades, whose axle has a cogwheel and turns the lower millstone. From the time of William the Conqueror, says M. L. Delisle,[4] there had been established at the entrance of the port of Dover a mill moved by the flow of the tide.[5] "In 1235 one of these existed

at Yaiza. In the 14 to century the archbishop of Rouen possessed six thirteen two site mills." In 1277 Philip the Fair conferred to William the Brewer the site mills established on the bridge of Dove near Darnetan.

Note 1.p.406. Imp. Lib.Attendee. No. 7402. Vol. 40.

Note 2.p.406. Mill of the constable, mill of Ivon, mill of the South.

Note 3.p.406. Library of Strasburg.

Note 4.p.406. Studies sur le cond. de la chose ajrtc. etc.

Note 5.p.406. (Latin note). Geneaby book, quoted by E. E. Mills. Vol. I. p. 124.

Note 6.p.406. Cartul. of Reccwg.

There exist in France water mills of old date and that are still in use; they are found in Normandy, Touraine, particularly in Tulone, where these works are almost always fortified, and were established during the Italian domination, the seccm of prosperity and development for that province. In Yaiza Dorre (?) were still seen the ruins of a fortified mill belonging to ruins known under the name of the castle of Ussen Clacone. That mill, and where is now to be seen only the architecture, consisted of two large piers with buttresses opposed to the current of the river and crowned by turrets, only the first courses of these were visible. The water wheel was placed between these two piers and consequently was perfectly protected. The plan of the ground story, accented by an arch connecting the two piers, was probably only a rectangular room. We have not been able to obtain any information concerning the upper part of this work. The construction certainly dates from the 13 to century, from consideration of the shape of the turrets.

Here (1) is the plan of that mill at A and the remains of the elevation at B. It is to note that the basement and was crowned by turrets, in fact nothing was to be feared here, the attacks coming from quarters (the mill being formerly surrounded by water). The floor of the ground story over the water wheel was placed at the level C and at D was a wooden cribbe supported on corbels, the entrance of the mill being at E. The mill of Tarn, Florac, given by W. Leg Orrana, was built in the 14 to century,"in 1474," says that author, "100 years after its construction. It was given by Henry VI,

at Veules.[6] In the 14 th century the archbishop of Rouen possed at Dieppe two tide mills." In 1277 Philip the Bold confirmed to William the Archer the tide mills established on the bridge of Ouve near Carentan.

Note 1.p.406. Imp. Lib.d'Etampes. No. 7402. Fol. 40.

Note 2.p.406. Mill of the constable, mill of Aver, mill of the South.

Note 3.p.406. Library of Strasburg.

Note 4.p.406. Etudes sur la cond. de la classe agric. etc.

Note 5.p.406. (Latin note). Domesday book, quoted by S. H. Ellis. Vol. I. p. 124.

Note 6.p.406. Cartul. of Recomp.

There exist in France water mills of old date and that are still in use; they are found in Normandy, Touraine, particularly in Guinne, where these works are almost always fortified, and were established during the English domination, the epoch of prosperity and development for that province. At Melun before 1830 were still seen the ruins of a fortified mill belonging to ruins known under the name of the castle of queen Blanche. That mill, and where is now to be seen only the substructure, consisted of two thick piers with buttresses opposed to the current of the river and crowned by turrets, only the first courses of these were visible. The motor wheel was placed between these two piers and consequently was perfectly protected. The plan of the ground story, supported by an arch connecting the two piers, was probably only a rectangular room. We have not been able to procure any information concerning the upper part of this work. The construction certainly dated from the 13 th century, from consideration of the stumps of the turrets.

Here (1) is the plan of that mill at A and the remains of the elevation at B. We do not think that the downstream end was crowned by turrets, in fact nothing was to be feared there, the attacks coming from upstream (the mill being formerly surrounded by water). The floor of the ground story over the motor wheel was placed at the level C and at D was a wooden bridge supported on corbels, the entrance of the mill being at E. The mill of Bagas, Gironde, given by M. Leo Drouyn,[1] was built in the 14 th century,"in 1436," says that author, "120 years after its construction, it was given by Henry VI,

hair of Holland, to pierre Ouarel, source." This mill is still remains today. Here (D 7) is the plan of the mill of Tessa or Fabien in the ground story, as it was established in a branch of the Tool. The side that measures the mill rose is it A. Two angles B, C direct the water on two angles D, C'. Downstream the water from the plates enters through openings covered by lintels, and D is an inlet. The entrance of the mill are at the upper and lower axis by doors covered by angles arches (C and C'). The can rests loose only by the inlet D, or directly by coal at the point A. That ground story is protected on three sides by a close opening in each side of the upper out. By a model shaft the machine to the second story E. From the mill operates the inlet one comes nearly on a level to the floor E by means of a trapezoids. By that door the grain is brought into the mill. This story is only one room, like the ground story, and contains a cribs at A, a little door I forcedly opened on a wooden gallery G, with probably attached since the later end. The also connected to a the upper story FIV by a wooden stairs. That story is planned at the four corners with lattice, one contained a chair in middle to the roof of the upper battlements. Four windows I light that room, also closed by 7 slots and having a fireplace.

Note I.p.109. In his book previously mentioned on Cathare milliters, p. 28. We cannot recommend too strongly the work of M. Leo Drouyn to our readers. One cannot find collected a more interesting data on the monuments of one of our beautiful provinces of France. Our readers will note therein a more ample experience of these civil and military milliers.

Here (J) is the perspective view of this mill taken from the point C.[1] Leo Drouyn, from whom we borrow these data, presents views and plans of several other mills taken in the same province and built during the 14 th century.

Note I.p.109. The particular views are our interpret. The other parts of the structure are nearly intact.

In the district are often profiled by the arches of a triple for agricultural mills, and even then the cribbes and mills, built of wood, formed out one aqueducts. Before 1777 there a mill existed at Ferrix in Tarn a typice of this kind entirely of rock as well as the mills belonging to it. Less entirely taken from the set of the 17 th century. At Villeneuve-Lomagne

king of England, to Pierre Durant, squire." This mill is still running today. Here (2 X) is the plan of the mill of Bagas or Bagatz in the ground story, as it was established on a branch of the Drot. The dike that maintains the mill race is at A. Two angles B, B′ direct the water on two wheels C, C′. Downstream the water from the blades escapes through openings covered by lintels, and D is an islet. The entrances of the mill are at the upper and lower ends by doors covered by pointed arches (G and H). One can reach those doors only by the islet D, or directly by boat at the point H. That ground story is protected on three sides by 6 slots opening in each side of the upper end. By a wooden stairs one ascends to the second story X X. From the hill opposite the islet one comes nearly on a level to the door E by means of a drawbridge. By that door the grain is brought into the mill. This story is only one room, like the ground story, and contains a privy at F; a little door I formerly opened on a wooden gallery J, that probably extended along the lower end. One also ascended to t the their story XXX by a wooden stairs. That story is equipped at the four corners with turrets, one containing a stairs that ascends to the roof of the upper battlements. Four windows l light that room, also pierced by 7 slots and having a fireplace.

Note 1.p.408. In his book previously mentioned on Guienne militaire, p. 28. We cannot recommend too strongly the work of M. Leo Drouyn to our readers. One cannot find collected m more interesting data on the monuments of one of our beautiful provinces of France, nor rendered with more charm and o scrupulous appearance of those civil and military edifices.

Here (3) is the perspective view of this mill taken from t the point P.[1] M. Leo Drooyn, from whom we borrow these data, presents views and plans of several other mills taken in the same province and built during the 14 th century.

Note 1.p.409. The battlements alone are now destroyed. The other parts of the structure are nearly intact.

In the cities men often profited by the arches of a bridge for establishing mills, and even then the bridges and mills, built of wood, formed but one structure. Before 1835 there s still existed at Meaux in Brie a bridge of this kind entirely of wood as well as the mills belonging to it. that entirely dated from the end of the 1; th century. At Chalons-sur-Saone

the above orifice communicating with the island was enclosed with round towers or dikes, with mills between these towers; at the arsenal; that nightmarish arrangement has remained till the 17 in century.[1] At Paris the bridge at Nanterre (miller's bridge), that crosses the larger branch of the Seine below the bridge at Charle occupies the palace, was established in the same conditions as that of Meaux.

Note 1.p.110. See chart. orbis terro. Folio. 2 vols. 1571. The wheels of Chelons-sur-Saone is found at the beginning of the fourth book.

We have not been able to find locations having any value concerning the form of windmills of the middle ages, or rather on the arrangement of their upper part, for they consist of a point upper for the body of the structure. The vignette that serve, and that gives a view of the city of Carcassonne in 1407, indicates one of the mills on the towers of the inner enclosure; now that representation resembles the mills of our giant a conical roof on a round tower and four wings covered of vines. At Valenciennes in 17 years since were still in the main some windmills of the 17 in century, that did not differ from ours.

In the 17 in century there existed windmills on the mill called the Moulins at Paris, situated between the present Place of the Pyrénées and the Montrouvert; and on several towers of the wall of Philip Auguste they had established before that epoch. The celebrated tapestry of the city hall, that it takes from the second half of the 16 in century, exhibits around the capital quite a large number of windmills on elevated points.

MILLSTONE. Vocabulary. (Arrastrestone Vocabulaire).

MINARET. Turning. Tower.

The swarting point of an arch or pierce. In the middle ages the architects of the Romanesque epoch always raised the summits of arches above the backs or the abscisses of capitals. That those architects had to draw an arcuvile or two points a B (1); instead of taking the centre of the arch on the line a b, they raised this point, for example, so that a visual ray did not miss the curvature of that arch by the effect of the

the stone bridge communicating with the island was equipped with round towers on piers, with mills between those towers a at the arches; that picturesque arrangement has remained till the 17 th century.[1] At Paris the bridge au Meuniers (millers' bridge), that crosses the larger branch of the Seine below t the bridge au Change opposite the palace, was established in the same conditions as that of Meaux.

Note 1.p.410. See civit. orbis terre. Folio. 2 vols. 1574. The view of Châlons-sur-Seone is found at the beginning of the fourth book.

We have not been able to find documents having any value c concerning the form of windmills of the middle ages, or rather on the arrangement of their upper part, for they consist of a round tower for the body of the structure. Yet the vignette cited above, and that gives a view of the city of Carcassonne in 1467, indicates one of the mills on the towers of the inner enclosure; now that representation recalls the mills of o our time; a conical roof on a round tower and four wings covered by cloth. At Castelnaudry 15 years since were still to be seen some windmills of the 16 th century, that did not differ from ours.

In the 15 th century there existed windmills on the hall c called des Moulins at Paris, situated between the present palace of the Tuileries and the boulevard; and on several towers of the wall of Philip August they had been established before that epoch. The celebrated tapestry of the city hall, that d dates from the second half of the 16 th century, exhibits around the capital quite a large number of windmills on elevated points.

MOUSTIER. Monastery. (Architecture Monastique).

NAISSANCE. Springing. Impost.

The starting poin of an arch on piers. In the middle ages the architects of the Romanesque epoch always raised the springings of arches above the bands or the abacuses of capitals. When those architects had to draw an archivolt on two columns A B (1); instead of taking the centre of the arch on the line a b, they raised this point, for example, so that a visual ray did not miss the springing of that arch by the effect of the

opposition of the shoguns.

In Article Construction, we have the reason that frequently monastic monasteries be raise the aspirants of arches. We can also refer to it in Article Drive.

DIRECT. Harbour. Vaubern Forces.

In the cross castles the harbour is the portion erected to shelter the navy and forming the base of the arches. In the military character, the harbour was designed to contain the powers, and at the center the priest masters opposite the door of the nave, i.e., more particularly to be present at the divine service outside of the church. During the middle ages the north harbour was not applied to the room or closed porcon of our churches; further there were no longer crossbyies or convents. Only since the beginning of archaeological studies that turn of harbour has been applied to the closed porcon as of certain churches, like the porches of Tiary, Varsiay, Tourner, etc. To avail access it, since we do not think that as afraid modify the vocabulary adopted by archeologes and archaeologies. It should at least be stated that the word harbour is not applicable to our religious edifices; it is replaced by the word porcon.

There are also open and closed porches. The character of the order of Tiary was there of the order of Cluneux all have no or less extensive closed porches before the nave. The porch of the church of Tiary was even a work of very large architecture, like those of the west porch of Vaulay, Charite-sur-Loire, St. Philbert of Tourns, etc. The distinction between open and closed porches often being very difficult to establish, we refer our reader to Article Porch for the study of that very interesting part of our religious edifices; the moment we cannot state why the archaeologies of our time have given to closed porches the name of narthex, while the true narthex was nearly an open portico, at least on its front side, in the first Christian basilicas.

TYP. Nave. Aisle.

The antique Roman basilica consisted of one or three aisles terminated by a semicircle service as tribunal, before which when arcos appeared, according to Vitruvius, was erected that

projection of the abacuses.

In Article Construction we gave the reasons that frequently compelled architects to raise the springings of arches. We can also return to it in Article Ogive.

NARTHEX. Narthex. Western Portico.

In the Roman basilica the narthex is the portico erected be before the nave and forming the back of the atrium. In the p primitive churches, the narthex was destined to contain the converts, and at the centre the penitent hearers opposite the door of the nave, i.e., those permitted to be present at the divine service outside of the church. During the middle ages the word narthex was not applied to the open or closed porches of our churches; further there were no longer proselytes or converts. Only since the beginning of archaeological studies that term of narthex has been applied to the closed porches of certain churches, like the porches of Cluny, Vezelay, Tournus, etc. We shall accept it, since we do not think that we should modify the vocabulary adopted by architects and archaeologists. It should nonless be stated that the word narthex is not applicable to our religious edifices; it is replaced by the word porch.

There are also open and closed porches. The churches of the order of Cluny and those of the order of Cîteaux all have more or less extensive closed porches before the nave. The porch of the church of Cluny was even a sort of very large ante-church, like those of the abbey church of Vezelay, Charite-sur-loire, S. Philibert of Tournus, etc. The distinction between open and closed porches often being very difficult to establish, we refer our readers to Article Porche for the study of that very interesting part of our religious edifices; the more that we cannot state why the archaeologists of our time have given to closed porches the name of narthex, while the true narthex was nearly an open portico, at least on its front side, in the first Christian basilicas.

NEF. Nave. Aisle.

The antique Roman basilica consisted of one or three aisles terminated by a semicircle serving as tribunal, before which when space permitted, according to Vitravius, was erected what

ne hall today a transverse aisle or transepts. The word nave
also signifies only that the hall is longer than wide, monos-
not by two aisles and a roof, or accompanied laterally by two
lower aisles, supporting a gallery of a east roof. In the fi-
rst Christian basilicas, like S. Paul-without-the-Walls at
Rome, the aisles have been opened to the manner of five; a
central nave and two side aisles on each side of the middle
nave. Today the name of nave is not given to the side aisles,
but only to the middle space, that is covered by vaulted gal-
lery or vaulted. The old church of S. Martin-the-Greater at
Paris, now Notre Dame de Lorette, consists only of a
single nave vaulted about the middle of the 12 th century and
terminated by a choir of the 11 th accompanied by a side aisle
with chapels. The materials of frames, beams, doors, Cart-
ron, Library, Tableaux, Tables, etc., have a central nave with
single side aisles before the transepts. The materials of Ta
bers, Murres, Colonne, the abbey church of S. Martin of Con-
lomes, etc., have a central nave accompanied laterally by du-
ble side aisles. Until the end of the 12 th century, the naves
of churches with side aisles normally exceeded 50.5 to 54.0
ft between the axes of the column; but after the Lombo period,
those naves attained 60.4 and 70.7 ft. between axes of piers.
As for the churches with a single nave, like the cathedrals of
Tuniers and of Alby (12 th and 13 th centuries), their inside
width reached 65.6 ft. and more. (Art. Architecture religieu-
se, Cathedrals, Tables). The romanic characters the churches
built during the 12 th century, were habitually composed of
two naves of equal height, with and crypt; these two naves
are separated by a row of piers (Art. Architecture romanique).
This arrangement is also observed for halls devoted to monas-
tic or civil uses, like the refectory of S. Martin-the-Greater
at Paris, and the old great hall of the palace at Paris.(Art.
Halls).

Our oldest French cathedrals were mostly received with a
central nave accompanied by aisles or double side aisles,
but without transepts. The cathedral of Noyon, among those a
erected during the 12 th century, and some of Chartres, form
the only exceptions to this rule. Not only those great church-
es possess no transepts, but they were without lateral chap-
el; nevertheless some of them preserved large very small cons-

we call today a transverse aisle or transepts. The word nave thus signifies only that the hall is longer than wide, enclosed by two walls and a roof, or accompanied laterally by two lower aisles, supporting a gallery of a shed roof. In the first Christian basilicas, like S. Paul-without-the-Walls at Rome, the aisles have been carried to the number of five; a central nave and two side aisles on each side of the middle nave. Today the name of nave is not given to the side aisles, but only to the middle space, that is covered by ceiled carpentry or vaulted. The old church of S. Martin-des-Champs at Paris, now Ecole des Arts et Metiers, consists only of a single nave rebuilt about the middle of the 13 th century and terminated by a choir of the 11 th surrounded by a side aisle with chapels. The cathedrals of Rheims, Amiens, Rouen, Chartres, Bayeux, Coutances, Tours, etc., have a central nave with single side aisles before the transepts. The cathedrals of Paris, Bourges, Cologne, the abbey church of S. Sernin of Toulouse, etc., have a central nave accompanied laterally by double side aisles. Until the end of the 12 th century, the naves of churches with side aisles scarcely exceeded 32.8 to 36.0 ft between the axes of the piers; but after the Gothic period, those naves attained 49.2 and 52.5 ft. between axes of piers. As for the churches with a single nave, like the cathedrals of Toulouse and of Alby (12 th and 14 th centuries), their inside width reached 65.6 ft. and more. (Arts. Architecture Religieuse, Cathedrale, Travee). The monastic churchsof the Jacobins, built during the 13 th century, were habitually composed of two naves of equal length, width and height; those twin naves are separated by a row of piers (Art. Architecture Monastique). That arrangement is also observed for halls devoted to monastic or civil uses, like the refectory of S. Martin-des-Champs at Paris, and the old great hall of the palace at Paris.(Art. Salle).

Our oldest French cathedrals were mostly coceived with a central nave accompanied by single or double side aisles, b but without transepts. The cathedral of Noyon, among those e erected during the 12 th century, and that of Soissons, form the only exceptions to this rule. Not only those great churches contain no transepts, but they were without lateral chapels; scarcely some of them preserved three very small ones ope-

[illegible] from the side aisle of the sanctuary. Excavations have [illegible] in the cathedral of Tous, until we all know about the middle of the 12 th century, here stood in line the bases of the piers that support to the middle of the triforium arcade, and when one knows that fact, we easily recognize how in the 12 th century, transepts were added to that great cathedral by Raymond Berenger IV, Count of Tous and Lord. It seems to the same architecture, the cathedral consists of a nave with side aisles and triforium tribunes. The architecture of the transverse aisle is easily recognizable there. The central of transept, which takes from the end of the 12 th century, has certainly vaulted tribunes. Now at Paris, holes made in the extension of the piers of the choir and have remained visible in the spandrels of the great vault of the crossing, level as to believe that this church was also conceived with tribunes. Finally at Narbonne, where construction dates back to the first years of the 12 th century, but where construction is plan in earlier form (Romanesque), there exists no transepts. Then one can conclude from these facts, that the prototypes of the French cathedral of the 12 th century, given at the moment when the Gothic voiding the efforts of the cathedrals and connected those great structures, only replaced a central nave with side aisles, without transverse aisle, triforium or clerestory, and even frequently without chevels. The French cathedral was then only a hall, a particular place of assemblage for the citizens, at the centre of which was the altar and the throne of the bishop, the canonical. Not as Romanesque cathedrals, that is more of these aisles, at Paris, Tours and Chartres, more galleries were arranged like the aisles of the second story of the entire building. A last argument in fact of the absence of transepts in the cathedral churches rebuilt at the normal when the art of architecture passed into the hands of layman.

In his Rational, William Durand is describing the different parts of the church (Lib. I, Rock. 17) says:- "Portain quemadmodum sunt facile in ter form of a cross," and in taking in a symbolical sense each part of the church from chair to the vicar, he does not mention the transverse aisle. He also do states that "certain churches" in his time were not in the form of a cross, it cannot be denied, that some existed without that.

opening from the side aisle of the sanctuary. Excavations that we made in the cathedral of Sens, built as all know about the middle of the 12 th century, have brought to light the bases of the piers that extended to the middle of the existing transept, and when one knows that fact, he easily recognizes how in the 14 th century, transepts were added to that great church by destroying two bays of the nave at right and left. At Senlis is the same arrangement, the cathedral consists of a nave with side aisles and without transepts. The addition of the transverse aisle is easily recognizable there. The cathedral of Meaux, which dates from the end of the 12 th century, was originally without transepts. Even at Paris, holes made in the extension of the piers of the choir and bays remaining visible in the spandrels of the great vault of the crossing, lead us to believe that this church was also conceived without transepts. Finally at Bourges, whose construction dates b back to the first years of the 13 th century, but whose composition in plan is earlier (Art. Cathedrale), there exist no transepts. Then one can conclude from these facts, that the programme of the French cathedral of the 12 th century, given at the moment when the bishops united the efforts of the communes and commenced those grand structures, only required a c central nave with side aisles, without transverse aisle, crossing or transepts, and even frequently without chapels. The French cathedral was thus only a hall, a basilica; a place of assemblage for the citizens, at the centre of which was the altar and the throne of the bishop, the cathedral. Let us again state, that in most of these edifices, at Paris, Senlis and Meaux, upper galleries were arranged like the alleys of the second story of the antique basilica. A text supports this fact of the absence of transepts in the cathedral churches rebuilt at the moment when the art of architecture passed into the hands of laymen.

In his Rational, William Durand in describing the different parts of the church (Chap. I, sect. 17) says:- "Certain churches are built in the form of a cross," and in taking in a mystical sense each part of the church from choir to the porch, he does not mention the transvesse aisle. Now since he states that "certain churches" in his time were not in the form of a cross, it cannot be doubted, that some existed without them,

and Gilles Ceuant, issued in 1295 and used in 1296, and been seen several French cathedrals without transepts. The simple assertion who makes that cathedrals created Amiens to give a aesthetical religious signification to the various parts of the church further indicates the tendencies of the higher clergy at the epoch when he wrote. It also discovered the crucifix of a cathedral, built by the aid of circumstances rather political than religious, the civil character that it retained in the minds of the urban people; and for as the establishment of the transepts, of the lateral chapels and the enclosure of the choir, bring the end of the 12 to and beginning of the 13 centuries; consequently the institution of the great primitive sense of the churches' purposes of the first Gothic period, in that i indicates the commercial movement by the bishops in the 12 to century, because they meant to profit by it to secure their power, and the clerical resources against that movement, when the royal power had firmly established itself, and the spiritualte must reduce the subjection of French society to a sort of theocracy.

XLVIII. Tiles. Moses.

A piece of wall Moses made from the face of a wall, pier or cistern, for placing a statue. Tiles are not common in the architecture of the middle ages; they are not used in the cliffes of the Carmelites church, and they appear only in the pavement of the 13 to century. Ta cannot give the name of a niches to arcade filled by round figures, for statue lines decorating the facades of Cote-Dame is Gothic-Ista or of the cathedral of Angoulême.

The architects of the middle ages did not thought of placing on the surface of a wall a recess without any motive other than to receive a statue. The Greeks had good sense with which they were endowed did not permit them to employ these masses of incoherence, that could only be conceived in architecture to the modiaeve times placed in their verses by certain poets. The crass architects of the earlier ages had adopted even the niche, for the system of their construction lent itself to that. In order to isolate the enormous masses of masonry in the vast structure, and to economize the materials, niches were made in the solid masonry, that after all were only recesses with

and William Durand, bishop in 1285 and dead in 1296, had then seen several French cathedrals without transepts. The minute attention with which that celebrated prelate sought to give a symbolical religious signification to the various parts of the church further indicates the tendencies of the higher clergy at the epoch when he wrote. It then concerned the erection of a cathedral, built by the aid of circumstances rather political than religious, the civil character that it retained in the minds of the urban people; and for us the establishment of the transepts, of the lateral chapels and the enclosures of the choir, during the end of the 13 th and beginning of the 14 th centuries; consequently the destruction of the great primitive naves of the bishops' churches of the first Gothic period, in that it indicates the communal movement urged by the bishops in the 12 th century, because they hoped to profit by it to ensure their power, and the clerical reaction against that movement, when the royal power had firmly established itself, and the episcopate must renounce the subjection of French society to a sort of theocracy.

NICHE. Niche. Recess.

A recess of small depth made from the face of a wall, pier or buttress, for placing a statue. Niches are not common in the architecture of the middle ages; they are not seen in the edifices of the Romanesque epoch, and they appear only at the beginning of the 13 th century. We cannot give the name of n niches to arcades filled by round figures, for example like those decorating the facades of Notre Dame la Grande at Poitiers or of the cathedral of Angouleme.

The architects of the middle ages had not thought of placing on the surface of a wall a recess without any motive other than than to receive a statue. The taste and good sense with which they were endowed did not permit them to employ these means of decoration, that could only be compared in architecture to t the useless lines placed in their verses by certain poets. The Roman architects of the empire used and abused even the niche, but the system of their construction lent itself to that. In order to lighten the enormous masses of masonry in the Roman structure, and to economize the materials, niches were made in the solid masonry, that after all were only recerses with

discharging arcade. The horizontal section of lesser arcades was either a semicircle or rectangle, and in this sort of soil was placed a statue. Yet in the architecture of the little a-ness the aisle having only the section necessary for their function, there was no chance to liberate them by voids. Thus these appear only as the base of buttresses, i.e., where the construction having nothing more to bear, it is well to give it a light appearance. Lateral niches are seen at the base of the buttresses of the nave of Notre Dame of Chartres. There are also seen to fore the base of some of the buttresses of the nave of the cathedral of Rouen (beginning of the 13 century). (1). Therefore about rarely, niches are placed on the buttress beside the portals and to compose the great gallery of the façade. Yet these niches are not made in the ma-ss, but form a projecting frame around a statue. One of the most beautiful examples of this sort of niche is seen on the jambs of the cathedral of Paris, at the height of the adorn-ing of the arches of the large portals. The buttresses rectangular above those lateral, the architect has erected on the lesser projection to crown it by a projecting and supporting the little monolithic column surmounted by an arcade, cover-ed by the slope of the pediment. These four niches that par-ticipate in the decoration of the porches are filled by four figures representing S. Stephen, the Martyr, the Prophet and S. Paul. To give (1 bis) the niche containing the protection of the Martyr.[1]

Note 1.p.415. This statue was destroyed at the end of the last (18) century, and has been restored by M. Geoffroy-Dechaume. It is one of the rare statues of that distinguished artist. The Symbolic Tortoise (its present is by M. Tromsmier. The statue of S. Denis is by M. Tessot, and that of S. Eligius by M. Gruillion. Another niche on the return is seen on the south side; it shelters the statue of S. Andrew, from the chisel of one of our best statuaries, M. Toussaint, recently deceased.

To cancel return as niches the pinnacles that cover the but-tresses of the cathedral church of Amiens (fig. 1 radio). Yet around the porch of the cathedral of Vienne the faces of the c-utresses at midpoint are lightened by niches containing a statue (2). (Janet 1750). One will note that these niches a

discharging arches. The horizontal section of these niches w was either a semicircle or rectangle, and in this sort of cell was placed a statue. But in the architecture of the middle a ages the solids having only the section necessary for their function, there was no chance to lighten them by voids. Thus niches appear only at the tops of buttresses, i.e., where the construction having nothing more to bear, it is well to give it a light appearance. Actual niches are seen at the tops of the buttresses of the nave of Notre Dame of Chartres. Others are also seen to form the tops of some of the buttresses of the nave of the cathedral of Rouen (beginning of the 13 th century). (1). Sometimes though rarely, niches are placed on the buttress beside the portals and to connect the great statuary of the sphays. But these niches are not made in the mass, but form a projecting frame around a statue. One of the m most beautiful examples of this sort of niche is seen on the facade of the cathedral of Paris, at the height of the springings of the arches of the three portals. The buttresses receding above those imposts, the architect has profited by the lesser projection to crown it by a projecting band supporting two little monolithic columns surmounted by an arcade, covered by the slope of the recession. Those four niches that participate in the decoration of the doorways are filled by four figures representing S. Etienne, the Church, the Synagogue a and S. Denis. We give (1 bis) the niche containing the personification of the Church.[1]

Note 1.p.415. This statue was destroyed at the end of the last (18 th) century, and has been restored by M. Geoffrey-Dechaume. It is one of the best statues of that distinguished artist. The Synagogue forming its pendant is by M. Fromanger. The statue of S. Denis is by M. Pascal, and that of S. Etienne by M. Chentillon. Another niche on the return is seen on t the south side; it shelters the statue of S. Marcel, from the chisel of one of our best statuaries, M. Toussaint, recently deceased.

We cannot regard as niches the pinnacles that cover the buttresses of the cathedral church of Rheims (Art. Pinacle). But around the choir of the cathedral of Mans the faces of the b buttresses at midheight are lightened by niches containing s statues (2). (About 1250). One will note that these niches a

allow the face of the statues to pass, and are only an area in recess to take face. The statues being set on a projecting ribbon, the niche is only a frame accentuating a statue projecting from the face of the structure.

These are always terminal niches until the end of the 17 th century. At the beginning of the 18 th, niches are decisively made at the expense of the surfaces; they face a recess. Thus are treated the niches arranged on the exterior between the windows of the great facade around the chapel of Versailles (1699). Within these the statues are placed on pedestals that are behind the external surface; they are bare, i.e., that the corbelings are always concealed. We assume that architects of the middle ages thought only that isolated statues placed in niches would produce a sharp effect; they took care to conceive their as lines in perspective. Besides these niches always the chapel of the castle of Versailles a corresponding decoration are the windows; they participate in the unity. On both sides of the central portal of that construction, [illegible] dating from 1727, one likewise sees niches arranged in banks, that [illegible] of statues placed in the spaces of the portal. Fig. 3 gives the arrangement of those niches, that we have traced in plan at A.

In the interior of that portal on the south wall of the transept exist round niches between the pedestals of the central portal and the two lateral ornamental tablets. These niches (1757) are very deep and are surmounted by arch vaulting as if to indicate a prominent point and not a recess, and the statues are still supported on pedestals.

It was only in the 17 th century that were made isolated niches, that could be regarded as such. One sees them at the middle of facades of certain houses of that epoch; but I believe they are always surmounted by a canopy, and are [illegible] rest on a corbel. (4).

Note 1.o.Jig. From the house called that of the queen of Sicily at Bonnur.

All these examples do not have the character of the niche, as it was understood after the 14 th century. In the facade of that house of the Musicians at Tours (Jig. Nelson, Fig. 11), the place between the windows are slightly hollowed like niches terminated by a semicircular arcuvolt; but the wall a

allow the face of the buttress to pass, and are only an arch in regard to that face. The statues being set on a projecting plinth, the niche is only a frame enclosing a statue projecting from the face of the structure.

Thus are always treated niches until the end of the 13 th century. At the beginning of the 14 th, niches are decidedly made at the expense of the surface; they form a recess. Thus are treated the niches arranged on the exterior between the windows of the great chapels around the choir of Notre Dame of Paris (L-325). Again there the statues are placed on pedestals that are behind the external surface; they are twin, i.e., that two personages are always combined. Et seems that the architects of the middle ages thought only that isolated statues placed in niches could produce a happy effect; they took care to combine them at least in pairs. Besides those niches around the choir of the cathedral of Paris form a continuous decoration wit the windows; they participate in the entirety. On both sides of the southern portal of that cathedral, church, a portal dating from 1257, one likewise sees niches arranged in threes, that continue the series of statues placed in the splays of the portal. Fig. 3 gives the arrangement of those niches, that we have traced in plan at A.

In the interior of that portal on the south wall of the transept exist actual niches between the gable of the central portal and the two lateral ornamental gables. Those niches (1257) are very shallow and are surmounted by high canopies as if to indicate a prominent point and not a recess, and the statues are still supported on pedestals.

It was only in the 15 th century that were made isolated n niches, that could be regarded as such. One sees them at the angles of facades of certain houses of that epoch; but l likewise they are always surmounted by a canopy, and the statues rest on a corbel. (4).[1]

Note 1.p.419. From the house colled that of the queen of S Sicily at Saumur.

All these examples do not have the character of the niche, as it was understood after the 16 th century. On the facade of that house of the Musicians at Rheims (Art. Maison, Fig. 11), the piers between the windows are slightly hollowed like niches terminated by a segmental archivolt; but the seated s

ability projecting strongly, and that on certain, producing a pronounced ovalline on that floors, and form an exterior like the convolution of flowers participating in a scene; far from observing as good in its aims, they rather seem to be in contrast. Also on the lower parts of certain facades of churches, in the solids of porches, one noticing such a series of vaults or crowned by cupolas. For the ellipse that fill these niches is locale such other and form a continuous rest of frames, and so one cannot point that is point placed in niches.

Like true artists, the sculptors of the middle ages rarely adopted an isolated structure. For them as for the Greeks, statuary was the texticonant of an line, a series, not it was not exceptionally. That they allowed the middle figure. (Fr. Lecoanre).

VIII. Halo.

A halo in the form of a disk, that accompanies the head of divine personages and of saints. "Fixed in air (conspicuous terrestrial," has turned a last chapter to the history of the halo in the centuries of the middle ages. It can act original to that learned essay, to which one must necessarily refer a case to preserve the analysis of origins of our old artifice. (Fr. Lecoanre, Paulhare).

Note 1.p.420. Paris. 1913.

IX. Valley.

A rectangular angle formed by two intersecting planes of roofs. Valley rafter denotes the timber of the carpentry, that supports the rafters of the two planes of the roof that intersect. In the old carpentry composed of crossed rafters, the rafters assemble on the valley rafter. (Fr. Charpente).

X. Vessel.

A cylinder of stone or of most fixed from the portion and forming the axis of a sacred edifice. Vessels are solid or hollow, elevated to the stage or instrument, in the last case supported later by columns of porches of front. (Fr. Vaisseau).

XIII. Eye. Round Window.

This name is given to circular openings pierced in domes.

statues project strongly, and rest on corbels, presenting a pronounced outline on that facade, and form an entirety like the combination of figures participating in a scene; far from appearing as each in its niche, they rather seem to be in concert. Also on the lower parts of certain facades of churches, in the splays of porches, one sometimes sees a series of niches crowned by canopies. But the statues that fill those niches jostle each other and form a continuous band of figures, and so one cannot regard them as being placed in niches.

Like true artists, the sculptors of the middle ages rarely adopted an isolated statuary. For them as for the Greeks, statuary was the development of an idea, a series, and it was but exceptionally, that they allowed the single figure. (Art. Statuaire).

NIMBE. Halo.

A halo in the form of a disk, that accompanies the heads of divine personages and of saints. M. Didron in his Iconographie chretienne,[1] has devoted a long chapter to the history of the halo in the monuments of the middle ages. We can add nothing to that learned essay, to which one must necessarily refer when it concerns the sculpture or painting of our old edifices. (Arts. Statuaire, Peinture).

Note 1.p.420. Paris. 1843.

NOUE. Valley.

A rentrant angle formed by two intersecting slopes of roofs. Valley rafter denotes the timber of the carpentry, that supports the rafters of the two slopes of the roof that intersect. In the old carpentry composed of trussed rafters, the rafters assemble on the valley rafter. (Art. Charpente).

NOYAU. Newel.

A cylinder of stone or of wood rising from the bottom and forming the axis of a screw stairs. Newels are solid or hollow, attached to the steps or independent, in the last case supporting them by means of mortise or rest. (Art. Escalier).

OEIL. Eye. Round Window.

This name is given to circular openings pierced in gables,

and which are indeed to give air and light to the roofs.

Cases with large round openings, used in vaults also for passage of bells, and that martially bore the crenelle of the imperial arches are also sometimes called eyes or lunettes. (Lunette). The eye or oculus of an oriental Parisian cathedral is a circular opening with imperial spiar, that was opened in the front gable wall above the porporty ceiling. The term of that tradition is still found in certain Gothic-use churches, especially south of the Loire. The poetic rose window in the Jerusalem of the eye of the cretative basili-ca. (Lat. rosa).

OGIVE. Pointed Arch. Diagonal Arch. Cross Vault.

Quite improperly the name of "ogive" is given to the figure formed by two circular arcs intersecting at any angle wheter-er. Many cases have just erected on the origin of this word, and every spirit minding with it freely is are mistaken in doubt. Men have so fully confused the matter, that any conci-dence seems to have been considered till quite times. In first instance that is to not present to give here a solution, that further it matters very little: it will suffice for us to fur-nish to our readers the data that we have been able to collect on the adoption of that form in architecture after the 12 cen-tury in France, statements which cannot be verified on the monuments themselves. In for the conclusion, we shall leave to everyone leisure to deduce it.

Note 1.p.111. "Croix d'ogives" at the beginning of the 12 th century signified the diagonal arches of a Gothic cross vault. Use there "croix d'ogives" or "arcs ogives" are most frequently found arches. "Ogive 11 croix d'ogives to form the ogives arches and on arch between 11 croix d'ogives." Ingoeria-tion last of a chapel at Lectoin, June, 1217. Archives of m-ne de Lugnes. See vol. II of Annales archeologiques, p.11, article by A. Lassus or "arc ogive.") Period the middle age and till the 12 th century, the arcs "ogives or cuives, arcs ogives" were applied only to crossed ribs. The other arches if pointed, were termed "arc doucies, ellerons, fourcerets. (Arts. Arc, Construction).

Compares having been invented, the intersections of circles were obtained, and consequently the figure called the pointed

and which are intended to give air and light in the roofs.

Bosses with large round openings, that in vaults allow the passage of bells, and that habitually take the profile of the diagonal arches are also sometimes called eyes or lunettes. (Art. Lunette). The eye or oculus of the primitive Christian basilica is a circular opening with internal splay, that was pierced in the front gable wall above the carpentry ceiling. The trace of that tradition is still found in certain Romanesque churches, especially south of the Loire. The Gothic rose window is the development of the eye of the primitive basilica. (Art. Rose).

OGIVE. Pointed Arch. Diagonal Arch. Cross Vault.

Quite improperly the name of "ogive" is given to the figure formed by two circular arcs intersecting at any angle whatever.[1] Many pages have been written on the origin of this word, and party spirit mingling with it (party in art matters is meant), men have so fully confused the matter, that any conclusion seems to have been postponed till calmer times. We first declare that we do not pretend to give here a solution, that further it matters very little; it will suffice for us to furnish to our readers the data that we have been able to collect on the adoption of that form in architecture after the 12 th century in France, statements whose accuracy can be verified on the monuments themselves. As for the conclusion, we shall leave to everyone leisure to deduce it.

Note 1.p.421. "Croix d'ougives" at the beginning of the 14 th century signified the diagonal arches of a Gothic cross vault. Now these "croix d'ougives" or "arcs ogives" are most frequently found arches. "Item II crois d'ougives to form the vaults above and an arch between II crois d'ougives." (Foundation deed of a chapel at Averdoin, June, 1347. Archives of duke de Luynes. See Vol. II of Annales archaeologiques, p.41, Article by M. Lassus on "arc ogive.") During the middle ages and till the 16 th century, the words "ogive or ougive, arcs ougives" were applied only to crossed ribs. The other arches if pointed, were termed "arc doubleau, tiercerons, formerets. (Arts. Arc, Construction).

Compasses having been invented, the intersections of circles were obtained, and consequently the figure called the pointed

arch. It is not the origin of the figure that it is important to seek, but the origin of its application to construction. F From the monuments of Asia, Greece and Italy of very high antiquity, we are shown pointed arches, i.e., tunnel vaults or cavities (for example like that of the treasury of Atreus), w whose section is given by two intersecting circular arcs; but all those monuments without exception present horizontal jointing, i.e., the beds of the stones forming these tunnel vaults or cavities are horizontal and not normal to the curves. But this is an essential point for architects, for one cannot give to these concave surfaces the name of arch or vault. Let us then abandon this origin that teaches us but one thing, to know that when it is necessary to cover a passage or a hall, there were given during the primitive epochs mentioned, various forms of corbellings, the sole means adopted to arrive a t that result. Recessions, inclined planes, curvatures, these a are always corbellings and not vaults, and the pointed form is merely a caprice of the constructor, not a system. The Etruscans indeed built true arches, i.e., composed of voussoirs with joints normal to the curve, and the Romans who built arches, tunnel and cross vaults, and hemispherical domes, never adopted the pointed arch, or if they did do so, those are the exceptions too rare to derive conclusions from them. The Romans accepted only one curve as generatrix of the vault, which is the semicircle, what is called the round or the segmental arch. From Augustus to Constantine is no exception to this m method. It is only in the 6 th century that we see the pointed arch on the shores of the Mediterranean, in Egypt at Cairo; and there it already appears as the result of calculation. In another work we have explained in a detailed manner how the a ancients employed the triangle to place their edifices in proportion;[1] how among those triangles they adopted three:- 1, the equilateral triangle; 2, the triangle erected on the diagonal of a pyramid with square base, whose vertical section t through the vertex parallel to one side of the base is an eq equilateral triangle; 3, the triangle whose base is 4 with a height of 2.5 taken vertically at the middle of that base. Th These three triangles give at the vertex an angle less than 90°; thus it is possible to inscribe them in a semicircle. The last of these triangles, that on which was drawn the pyramid

of Euclid, and again proved among the Pythagoreans as derived from the perfect triangle, according to the measurement of Plutarch, in that that at A (1): a b being divided into 1 parts, the perpendicular erected at the point c at the middle of the base, is let off 1.4 parts c d: joining the points d and a c b, we obtain the triangle a b d. From the middle of one side b d erecting a perpendicular to cut the base at e, e is the centre of the arc b d'd, of which the side b d is upward; consequently similarly for the side a d, we have traced two arcs intersecting at the point d, and then commence what is referred a pointed arch. Taking the triangle a b d as the generator of proportions, i.e., as giving a satisfactory relation between the base a c and the height c d, it was natural to repeat this relation between the span and the height of the keystone of the arch. By joining these methods processed in the architecture of Alexandria, from the 6 to century of our era, and the school of the Saracens, that soon arose to a remarkable degree of splendor among the peoples of the Orient, leaders of the architecture to which is given the name of Arab. The details of the Greeks found itself again in this principle of the proportion of angles, as we have demonstrated elsewhere.

note 1.p.1[illegible]. [illegible] [illegible].

note 2.p.1[illegible]. Traité sur les [illegible].

note 3.p.1[illegible]. [illegible] sur l'architecture.

The equilateral triangle (fig. 1 at 7) is also a generator of the diagonal arch; but it was only employed much later, while the triangle taken on the diagonal of a square pyramid, whose vertical section through the vertex parallel to one side of the base gives an equilateral triangle, and was adopted very early for tracing the pointed arch. Let c d n be one half the horizontal projection of a square pyramid, whose vertical section on i k is an equilateral triangle; the vertical section on the diagonal f n gives the triangle f n l. Erecting a perpendicular m m to the middle of one side n l of this triangle, the point m at the intersection of this perpendicular with the base f n will give the centre of the arc n o l. Tracing from the point l as vertex an angle equal to the angle l'f e, so that the line l p divides this angle into two equal angles, we have the two sides l e, l r of an equilateral triangle; prolonging the tracing of the arcs l o b to their inter-

of Gheops, and which passed among the Egyptians as derived f from the perfect triangle, according to the statement of Plutarch,[2] is then that at A (1); a b being divided into 4 parts, on the perpendicular erected at the point c at the middle of the base, we lay off 2.5 parts c d; joining the points d and a to b, we obtain the triangle a b d. From the middle of one side b d erecting a perpendicular to cut the base at e, e is the centr of the arc b d'd, of which the side b d is chord; proceeding similarly for the side a d, we have traced two arcs intersecting at the point d, and that compose what is termed a pointed arch. Taking the triangle a b d as the generator of proportions, i.e., as giving a satisfactory relation be between the base a b and the height c d, it was natural to r retain this relation between the span and the height of the keystone of the arch. By following these methods proceeded t the architects of Alexandria, from the 6 th century of our e era, and the school of the Nestorians, that soon arose to a remarkable degree of splendor among the peoples of the Orient, fathers of the architecture to which is given the name of Arab. The genius of the Greeks found itself again in this principle of the proportion of arches, as we have demonstrated elsewhere.[3]

Note 1.p.422. Neuvieme Entretien sur l'architecture.

Note 2.p.422. Traite sur Isis et Osiris.

Note 3.p.422. Neuvieme Entretien sur l'architecture.

The equilateral triangle (Fig. 1 at B) is also a generator of the diagonal arch; but it was only employed much later, w while the triangle taken on the diagonal of a square pyramid, whose vertical section through the vertex parallel to one side of the base gives an equilateral triangle, and was adopted very early for tracing the pointed arch. Let f g h be one half the horizontal projection of a square pyramid, whose vertical section on i k is an equilateral triaugle; the vertical section on the diagonal f h gives the triangle f h l. Erecting a perpendicular m n to the middle of one side h l of this triangle, the point n at the intersection of this perpendicular with the base f h will give the centre of the arc h o l. Tracing from the point l as vertex an angle equal to the angle l'f g, so that the line l p divides this angle into two equal angles, we have the two sides l g, l r of an equilateral triangle; prolonging the traces of the arcs l o t to their inter-

interpretation with the point $\frac{1}{2}$ c, $\frac{1}{2}$ d; $\frac{1}{2}$ c as analytical triangle vices with $\frac{1}{2}$ ac; $\frac{1}{2}$ c, $\frac{1}{2}$ d, $\frac{1}{2}$ ac, $\frac{1}{2}$ ac, $\frac{1}{2}$ d. The original arch $\frac{1}{2}$ c $\frac{1}{2}$ d is a Gothic arch; it plays a greater area $\frac{1}{2}$ c $\frac{1}{2}$ d between the arch, the proportions of the triangle $\frac{1}{2}$ c $\frac{1}{2}$ d, and as its apex point c, the proportions of the analytical triangle $\frac{1}{2}$ c $\frac{1}{2}$ d. The faces of the piers of the arch will be as a and d, i.e., in the vertical stream the two points c, a. This form of measurement area was frequently applied in the proceeds of Gothic, and is found already ordered for the construction of the portions of the arches as early about 1[?], when such variations in the mode of erection. But the principles of the school of Alexandria and the Greek artists, masters of the origins of the last after the 7 th century, did indeed more than to give the ordered arch a method of treating to satisfy a definite feature for proportion. Already in the construction of Gothic arches the lines of the voussoirs were normal to the curves and tending to the two centres, as seen at 7; that consequently the construction accorded with the form, and all these pointed arches were more realistic than the round arch, while exerting a much smaller thrust, yet the anti-real structure was not discovered any other application of this new form, and the area of vault was not modified by it. It was reserved for the architects of more recent to turn the possession of the pointed arch and to make it the starting point of a new construction, of an original art.

Note 1.-1.1. The Italian Gothic never understood the reason, that caused the adoption of the pointed arch from the point of view of proportions and of its mutual functions. One can have proof of this if we observe that nearly all ribbed vaults are jointed like a round arch, i.e., that the joints of the consecutive voussoirs from a single centre, which is necessary, if that the proportions of these voussoirs nearly always present a discreetable proportion between the base and the height. But the Italians of the middle ages are not conquered much of Greek art after the late time, and the Greeks have i this, for they recorded them as borborions.

In pointed or round arches for the ordinaria analysis then already, although the pointed arch provided more at first in Greek that these joints were arranged in the vault

intersection with the sides l r, l g; g r l is an equilateral triangle whose sides g l and r l are chords of the arcs l o r, l o'g. The pointed arch g r l is a horseshoe arch; it gives a greater span f h between the two arcs, the proportion of the triangle f h l, and at its springing q r, the proportion of the equilateral triangle q r l. The faces of the piers of that arch will be at s and t, i.e., in the verticals through the two points f, h. This form of horseshoe arch was frequently employed in the monuments of Persia, and is found already adopted for the construction of the porticos of the mosque of Amrou at Cairo built about 640, with some variations in the mode of tracing. But the architects of the school of Alexandria and the Greek artists, leaders of the peoples of the East after the 5 th century, did nothing more than to give the pointed arch a method of drawing to satisfy a delicate feeling for proportion. Although in the construction of these arches the joints of the voussoirs were normal to the curves and tending to the two centres, as seen at X;[1] that consequently the construction accorded with the form, and all these pointed ar arches were more resistant than the round arch, while exerting a much smaller thrust, yet the oriental architects had not d discovered any other application of this new form, aud the system of vaults was not modified by it. It was reserved for the architects of north France to take possession of the pointed arch and to make it the starting point of a new construction, of an original art.

Note 1.p.424. The Italians have never understood the reasons, that caused the adoption of the pointed arch from the point of view of proportions and of its actual function. One can have proof of this if he observes that nearly all pointed arches are jointed like a round arch, i.e., that the joints of the voussoirs radiate from a single centre, which is nonsense; t that the proportions of these pointed arches nearly always present a disagreeable proportion between the base and the height. But the Italians of the middle ages did not comphehend much of Greek art after the late time, and the Greeks knew t this, for they regarded them as barbarians.

On pointed or round arches (for the orientals employed them simultaneously, although the pointed arch persisted more at Cairo and in Persia than elsewhere) were erected in the entire

that conservative and apparently calcific, or in the least ignorant of the Ancient Tradition, without ceasing to derive from that one form of Zeus consciousness of the nature in which it the conservation of vanity. This best intuitive and practical means that distinguishes the cwolves of the extreme Yes, my articles from the beginning of the 12 th century, i.e., after the first crusade, were manifestos of the spiritual arm and highly made of it an application terrible in reality. Ignii tess in fresco only the fresco really was known, and was above to transform it without obtained only rate although initiating a begin to actually see crusaders each zero than as always. To leader consequent is accurate and verily in prior, the Zeus vanit was only clearly after measures affirmations, only by the aid of experiences. The crusaders frames of the fresco vanit were built or a language, and when it was tested so constant time of robbs, they offered to establish; the crosse were raised, and a strongness was made a regular this form of vanit not two them, so as to fire as I least cerazin projection to trace Zeus, case was ill not have but to minimis behaves the sacts of twinkers or of jusis cerazin oldest. They lead always to the Zeus, and could by means of permanent masters of or joined drains from the defeasible of the 12 th century to minimis the lines of his vanit. These joined drains (linchael arrows) were already a great advance.

Note 1.p.425. See the vanit of the side aisles of the c ourch of S. Martin-les-Champs at Paris; those of the side a isles of the church of Poissy, etc.

The Dominicans, who from 1th 11 to century were drawn in the art of vanitist, and who had formed a school of architecture already military at that moment, were the first who know to apply the orders are to construction, not only of ar- ches but also of vanits.[2] In somewhat military aid the East, have results from having joined other; the 12 th century to Tresor will lead this arch towards a revolution in the art of construction.

Note 2.p.425. The trumeaux arches of the church of S. Ter- ont of Perpignan date from the last years of the 12 th century and are already pointed.

In fact all Dominican and Franciscan monuments vanit in Paint-

East pendentives and spheroidal calottes, as in the first times of the empireof Byzantium, without seeking to derive from that new form of arch consequences of the nature to modify t the construction of vaults. With that inventive and practical genius that distinguishes the peoples of the extreme West, our architects from the beginning of the 12 th century, i.e., after the first crusades, took possession of the pointed arch and quickly made of it an application fertile in results. Until then in France only the Roman vault was known, and men strove to transform it without obtainiug only rude attempts indicating a desire to satisfy new requirements much more than au advance. No longer constructing in concrete and rarely in brick, the Roman vault was only closed after numerous difficulties, only by the aid of experiments. The projecting groins of the Roman vault were built on a centering, and when it was desired to construct them of rubble, they offered no stability; the crowns were raised, and a compromise was sought between this form of vault and the dome, so as to give the l least possible projection to these groins,[1] that men did not know how to maintain between the parts of cylinders or of conoids thrusting outward. They tended always to the dome, and sought by means of permanent centres or by jointed groins from the beginniug of the 12 th century to maintain the lobes of the vaults. These jointed groins (diagonal arches) were al-already a great advance.

Note 1.p.425. See the vaults of the side aisles of the c church of S. Martin-des-Champs at Paris; those of the side a aisles of the church of Poissy, etc.

The Cluniacs, who from the 11 th century were masters in t the art of building, and who had formed a school of architecture already brilliant at that epoch, were the first who knew how to apply the pointed arch to construction, not only of arches but also of vaults.[2] In constant relations with the East, they brought from thence the pointed arch; but it was only on French soil that this arch produced a revolution in the art of construction.

Note 2.p.425. The transverse arches of the church of S. Front of Perigueux date from the last years of the 10 th century and are already pointed.

In fact all Cluniac and Cistercian monuments built in Pales-

Palestine before the 13 th century, and so fully described by count Melchior de Vogue in his work on the Holy Land,[3] in adopting the pointed arch still retained the system of Romanesque construction, and in none of these edifices does the pointed arch intervene to modify the Roman cross vault, the tunnel vault or the dome. But as soon as introduced in the French provinces north of the Loire, the pointed arch combined with the vault and modified it. First see how the combination occurred. Let (2) be a hemispherical dome whose horizontal projection is presented in perspective; inscribing a square a b c d in the circle and erecting two vertical planes on the two diagonals a d, b c, the hemisphere is cut into four equal parts a b e, a c e, c d e, d b e. A vertical plane erected on a b will intersect the hemisphere in a semicircle a b f, and assuming this semicircle to be a round transverse arch, and repeating this on the four sides of the square, one will obtain a horizontal calotte penetrated by four cylinders intersecting at right angles and forming four pendentives. But if we desire to make of this calotte vault borne on pendentives a cross vault, instead of semicircles on the sides a b, b d, etc., we erect four pointed arches a b g, b d h, etc., connecting the crowns g h of these pointed arches with the point e, we detach from the calotte the diagonal groins a e, b e, d e, etc., and we obtain the curved surfaces a g e, b g e, etc., which can be portions of tunnel vaults generated by the pointed arches and giving by their penetrations in the vertical diagonal planes a d, b c, th semicircles a c d, b e c. Thus was already solved the essential problem, viz:- to be able to make cross vaults on all plans with generating arches of different heights and diameters. The Romans and Byzantine Greeks had not a attempted anything until then, except to cut th hemispherical vault by vertical planes, which section was always given only as a semicircle.[1] Our western architects proceed the same, only that having seen the pointed arch, then set in place of the semicircle given by the vertical section, and raised the sides of the dome on that pointed arch. Their operation is simple in principle and can be defined thus:- assuming a hemispherical dome of elastic material and flexible, making the four c cuts vertically over the sides of a square inscribed in the circle, one raises a little with the finger the upper part of

Note 8.p.125. Les qualités de la Terre Saints, by count M. de Vogüé. Paris. 1904.

Note 1.p.126. By the reason that modern section of a sphere by a plane gives a circle.

Note 2.p.126. Other discoveries as simple in principle and fertile in results have taken much time to appear in this world; but rarely have these flashes of the human mind been regarded as a sign of sorcerism. Herein have people, in the midst of which men light has appeared, sought to aim the spl-endor.

Let us first take one of the vaults of the side aisles of that church, vault built on a square plan (7). The generative fact of that vault is a semicircle. The chord is that the two vertical planes passing through the diagonals a b, c d, give two semicircles, one of which is revolved down in a b d. To trace the transverse arches, first the line traced by the vertex i of the semicircle was taken by diagonal c b, as we show the springings of those arches. The level line E C being drawn, the length of this line being d b the size of the square, this line was divided in four parts; erecting a perpendicular at the middle of this springing line, this perpendicular was divided into 2 1/2 parts, each equal to a traverse of the springing line. Thus was traced the triangle c b f. By this the middle of each side of this triangle describe a semicircle e i, the intersections i of these perpendiculars with the line c b were the centres of the original arcs c f e. Joining the crown d' of the vault with the crowns of the four arches, the cross vault generated by a semicircular line and by four circular arches was constructed.

The principle being adopted, the consequences followed with rigorous facility. For the inner circumscribe, the first ex-ercerpted was not to build vaults on a square plan, but on rectangular plans. In that case the forces could cause vaults to wide: penetrations, Vault groin vaults, i.e., generated by

each cut; the surfaces remaining from the hemisphere follow that movement and form two diagonal folds, that vanish at the top of the calotte. To obtain such a simple result, how many centuries were necessary? [2] In the porch of the abbey church of Vezelay, built about 1135, we find an application of this principle already wise and reasonable.

Note 3.p.425. Les eglises de la Terre Sainte, by count m. de Vogue. Paris. 1860.

Note 1.p.426. By the reason that evern section of a sphere by a plane gives a circle.

Note 2.p.426. Other discoveries as simple in principle and fertile in results have taken much time to appear in this world; but rarely have those flashes of the human mind been regarded as a sign of barbarism. Rareln have peoples, in the m midst of which new light has appeared, sought to dim its splendor.

Let us first take one of the vaults of the side aisles of that porch, vaults built on a square plan (3). The generating form of that vault is a hemisphere. The proof is that the two vertical planes passing through the diagonals a b, c d, give two semicircles, one of which is revolved down in a b d. To trace the transverse arches, above the line formed by the abacuses A of the capitals was taken the distance A B, so as to show the springings of those archer. The level line B C being drawn, the length of this line being d b the side of the square, this line was divided in four parts; erecting a perpendicular at the middle of this springing line, this perpendicular was divided into 2 1/2 parts, each equal to a division of the springiug line. Thus was traced the triangle g h f. Fr From the middle of each side of this triangle erecting a perpendicular e i, the intersections i of these perpendiculars wi with the line g h gave the centres of the pointed arch g f h. Joining the crown d′ of the vault with the crowns of the four arches, the cross vault generated by a hemispherical dome and by four pointed arches was constructed.

The principle being adopted, the consequences followed with prodigious rapidity. For the Roman architects, the great embarrassment was not to build vaults on a square plan, but on rectangular plans. In that case the Romans built tunnel vaults with penetrations, Weslh groin vaults, i.e., generated by

two intersecting arches of different diameters; the cylinders of the smaller diameter having their springings above the level of the springings of larger diameter, which crossed a very out allock. For when the cross has a straight point of entry vault, this substructure was disappear. In was exhibited in Fig. 7 now from a mathematical calculus one could make a cross vault on a square plan, by substituting ribbons arches for the entirely another structure given by rectangular planes erected on the sides of the inscribed square. The possibility of this innovation did not require to be waited for.

Let (1) be the base on a circular plan centre as A. The vertical section of that base made at a diameter divide the projected curve B C D, whose rise A D has 2 1/2 of the four divided the base. It is required to make of this vault present the form of a base, a rectangular cross vault. For the horizontal plan of that rectangular vault is the rectangular parallelogram B F G C inscribed in the circle. If the dome were hemispherical, the vault mentioned applied on B F, F G, would give the semicircles B I F, B H G; but we fear the thrusts, and we have chosen the pointed arch as a means for making these thrusts less powerful. In order to conform to a system of proportions that satisfies us rather than the round arch. We then divide the base lines of our semicircles B F, F G, into two equal parts, and taking the points I I', K K', as centres, the lengths I F, I'B, K G, K' E, as radii, we describe the two pointed arches B L F, B V E, pointed arches that are the required form of the transverse arches in which rest the vault. Hence the diameters B C, F E, whose revolved form is given by the pointed arch B D C, will become the diameters, and the vault will be rather a cross vault than one given by the dome; further we shall be able to give to the arcs B F, F E, different cross relative lengths and curvatures. In this way this problem were constructed the high vaults of the porch of the abbey church of Vezelay. But let us first state an essential fact, that seems to have been neglected in the theories each as to this day on the construction of the cross vaults of the middle ages; this is that the making of the groining at the moment of transition was not done for the interior of the transverse or side arches, nor for the diagonals. In the example of Fig. 7, the dome of the transverse arches

two intersecting cylinders of different diameters; the cylinders of the smaller diameter having their springings above t those of the cylinders of larger diameters, which produced a very bad effect. But when the dome became the starting point of every vault, this embarrassment must disappear. We have explained in Fig. 2 how from a hemispherical calotte one could make a cross vault on a square plan, by substituting pointed arches for the semicircular sections given by vertical planes erected on the sides of the inscribed square. The consequences of this innovation did not require to be waited for.

Let (4) be the dome on a circular plan with centre at A. The vertical section of that dome made on a diameter gives the p pointed curve B C D, whose rise A D has 2 1/2 of the four dividing the base. It is required to make of this vault presenting the form of a teat, a rectangular cross vault. Let the horizontal plan of that rectangular vault be the rectangular parallellogram B F E C inscribed in the circle. If the dome were hemispherical, the vault sections erected on B F, B E, w would give the semicircles B G F, B H E; but we fear the thrusts, and we have adopted the pointed arch as a means for making these thrusts less powerful, in order to conform to a system of proportions that satisfies us better than the round arch. We then divide the base lines of our sections B F, B E, into two equal parts, and taking the points I I′, K K′, as c centres, the lengths I F, I′B, K E, K B, as radii, we describe the two pointed arches B L F, B M E, pointed arches that are the revolved forms of the transverse arches on which will rest the vault. Hence the diameters B C, F E, whose revolved form is given by the pointed arch B D C, will become the diagonals, and the vault will be rather a cross vault than one given by the dome; further we shall ba .ble to give to the arcs B F, B E, diameters whose relative lengths are arbitrary. By following this principle were constructed the high vaults of the porch of the abbey church of Vezelay. But let us first state an essential fact, that appears to have been neglected in the researches made up to this day on the theories of the cross vaults of the middle ages; this is that the making of the drawing at the moment of transition was not done for the intrados of the transveese or side aches, but for the extrados. In the example of Fig. 3, the depth of the transverse arches

is independent of the drawing, it is laid off downward. It is the top surface of the vault to which men first sought to give a solid form, reasoned and lending itself to all combinations. The transverse arches are placed beneath it like a rib or a discharging arch intended to support structures over it. Thus the diagonal groins do not yet appear, their presence not being regarded as absolutely necessary,[1] while the vaults derived from the dome support themselves. Let us then see those high vaults of the porch of Vezelay.(5). The four piers being drawn, -- they are indicated by hatching,-- according to what we have just demonstrated in the preceding example, the diameters of the generating dome are the two diagonals A B, C D; the vertical section of this dome made on its diameter given by the (half) curve B E, the diameter having 4 parts and the rise 2 1/2. The extrados of the transverse arches starts from the points D B, the extrados of the side arches from the boints A B. That transverse arch being revolved is drawn thus:- the abacuses of the capitals being at the level G, so as to show them, the springings were raised to H. The base li line h i of the extrados was divided in 4 parts, on the middle k of this line being erected the perpendicular k l, it was m mad 2 1/2 parts, so that this rise k l may be to the base as 2 1/2 to 4. Establishing the triangle with side h l, erecting a perpendicular at the middle, the intersection of that perpendicular with the base line h i gives the centre g of the arc h g'l. Raising the springing line of the side arches by the height o p above the abacuses of the capitals, one proceeds the same as for the transverse arch, the base line A D of these side arches beiug to the rise p g as 4 is to 2 1/2. The vertical section on the great axis o t of the vault gives at S the crown E of the vertical section made on A B. at T t the extrados of the crown of the side arch, at l the extrados of the transverse arch. If we join the point T to the point S by a straight line, we can clear the groin projected in B X S; then we seek on the base line at s the centre of an arc passing through the points T S. That curve is the vertical section of the line F t of the crowns. As for the point l, it can be joined to the point S by a straight line, as shown by the vertical section V made on F P. The depth of the transverse i R b being fixed, it is found that the springing line R H comprised

between the intrados is divided in three equal parts by the points g and m, centres of the pointed arch. Then this arch is pointed. One then notes that the entire drawing is determined by the extradosses of the arches, that this vault is a c compromise between the dome and the cross vault, that the introduction of the pointed arch gives a great liberty to the c construction in the arrangement of the vaults on a rectangular plan, and that still the artist has carefully observed a principle of proportions, that he has regarded as good and n not without reason, since it results from the triangle to w which the ancients attributed a perfect harmonious value.

Note 1.p.429. These diagonal arches are called "ogives" in the construction of Gothic vaults. (Art. Construction).

An apparently purely material and minimum difficulty soon compelled the architects to make a new advance in the drawing of vaults and to extend the applications of the pointed arch. About the end of the 12 th century they commenced religious and civil edifices of dimensions unusual until t em. The widths of the great naves was carried to 49.2 and 52.5 and even up to 65.6 ft.[1] The art of architecture had then exclusively fallen into the hands of the laymen, and they soon comprehended the entire benefit to be derived from the new system of vaults. With that logic that characterizes the inhabitant of Gaul, the masters of works recognized, that since only two d diagonals are retained from the dome, or two sections made on the diagonals of a parallellogram inscribed in the circle, the base of that dome, it was frankly necessary to give to these two diagonal arches a useful and indispensable function; it was essential to make them the skeleton of the vault, and to rest on that skeleton compartments independent of each other, thus being able to incline in any direction, to be skew, to elongate, to become very concave or almost flat. The vaults of the cathedrals of Paris and Senlis, those of many churches of Ile-de-France built from 1160 to 1200, already present a number of combinations, that indicate how much the lay school emaucipated itself in a very few years, while retaining the primitive principle derived from the dome of the pointed arch. Yet, -- for however rapidly they progressed, there are always transitions between the point of departure and the point of arrival, -- the dome regarded as generatrix is a trad-

Note 1.p.121. Xoos of the old cathedral of Toulouse.

The main vaults of the choir of the cathedral of Paris, ma- as [illegible] STARTS the year 1163, [illegible] is in most res- pect with a subject of interesting studies. The date of their construction is certain, and they have not been modified lat- er, as occurred for most spans of the 12 in century.

The memory of the dome evidently inspired the drawing of t these vaults (3). A circle with centre at O and with radius O A was first drawn. This circle was divided into 9 parts. F from the points 2 and 7 were drawn two lines parallel to the main axis A A'. These two lines 2 B, 7 D, are the faces of t the walls of the main nave [illegible] two circular [illegible] 7, [illegible] the faces of t [illegible] two [illegible]. [illegible] that is the horizontal projection of the transverse arch of the sanctuary. Lines F 2, E 4, F 5, E 6, connect the middle of the transverse arch F 2 [illegible] [illegible] conformity, and [illegible] [illegible] al arches, ribs of the vaults of the sanctuary. The lines 2 B, 4 [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] al arches sustaining the radiating arches. A line 2 O perpendi- cular to the main axis and tangent to the circle, gives the h horizontal projection of the last transverse arch of the great cross vaults. Having taken on the main axis a length O H equal to O B, one obtains the centre, the crown of the cross vaults F H D B. But just as the triangle H E 6 is traversed by the ar- chaverse arch E 7, they have thought to divide the triangle O H 6 by a transverse arch H I K. So much for the horizontal projections. For drawing the arches, the method followed is t this:- -- the transverse arch B D, F 6 or 2 7, is represented by a triangle whose base is 4 and height 2.5. On the middle of that base or springing line 3 D divided in 4 parts is rais- ed the perpendicular a b. This has 2.5 parts equal to each 1 division of the base, and the triangle B D b is drawn. Leaving

tradition so powerful, tha for the construction of the great vaults, the architects did not yet dare to trust themselves entirely to the results of the system, that we have just indicated. They still had in mind the shape of the dome and they groped.

Note 1.p.431. Nave of the old cathedral of Toulouse.

The high vaults of the choir of the cathedral of Paris, which were completed before the year 1190, supply us in that respect with a subject of interesting studies. The date of their construction is certain, and they have not been modified later, as occurred for most apses of the 12 th century.

The memory of the dome evidently inspired the drawing of t these vaults (6). A circle with centre at C and with radius C A was first drawn. This circle was divided into 9 parts. F From the points 2 and 7 were drawn two lines parallel to the main axis A A′. These two lines 2 B, 7 D, are the faces of t the walls of the high choir above the piers. One sees that the two circular segments 2 3, 6 7, project beyond the faces of t the two walls. The points 2 and 7 have been joined by a line, that is the horizontal projection of the transverse arch of the sanctuary. Lines E 3, E 4, E 5, E 6, connect the middle of the transverse arch 2 7 with the dividing points of the circumference, and are the horizontal projections of the diagonal arches, ribs of the vault of the sanctuary. The lines 3 E, 6 E are prolonged to intersect the face lines 7 D, 2 B, and are the horizontal projections of the branches of the diagonal arches abutting the radiating arches. A line F G perpendicular to the main axis and tangent to the circle, gives the h horizontal projection of the last transverse arch of the great cross vaults. Having taken on the main axis a length 9 H equal to 9 E, one obtains the centre, the crown of the cross vault F G D B. But just as the triangle G E 6 is divided by the transverse arch E 7, they have thought to divide the triangle D H G by a transverse arch H I K. So much for the horizontal projections. For drawing the arches, the method followed is t this:- -- the transverse arch B D, F G or 2 7, is generated by a triangle whose base is 4 and height 2.5. On the middle of that base or springing line B D divided in 4 parts is raised the perpendicular a b. This has 2.5 parts equal to each d division of the base, and the triangle B D b is drawn. Laying

off on the base line from D to e a depth equal to that of the voussoirs of the transverse arch, the point e is joined to t the crown b. From the middle of this line e b, erecting a perpendicular as far as its intersection with the line B D, one obtains at the centre of one branch of the transverse arch. As for the diagonal arches, that are the last remains of the dome, they are round as indicated by our revolution; their centre being raised to g above the abacuses of the capitals, so that the crown of the arches is found at a level higher t than that of the crowns b of the transverse arches, for they adhere to having a slope on the section of the vault from H to a. Therefore it was necessary for the crowns of the transverse intersecting arches I K to find themselves at the level of the crowns of the diagonal arches. Thus at p was raised the centres of the branches of this transverse arch revolved in o our Fig. The vertical projection of the transverse arch 2 7 of the sanctuarw is exactly that of the transveese arches B D, F G. But as the branches of the radiating diagonal arches of the sanctuary must abut the crown E of that transverse arch 2 7, these branches are excentric, they are not radii of the circle whose centre is C; then the branch 3 E is shorter than the branch 4 E. Then is required a special drawing for each of these two branches. These traces are revolved in our Fig.; the crowns l and m of these branches evidently reach the level of the crown F of the transverse arch 2 7.

From all this it results that the groin arches G B, F D, F 6, G 3, and the branches 4 E, 5 8, are indeed sides of domes between which have been pierced side arches and transverse arches arsumiug a pointed curve. The architects even dared not yet to free themselves from the concave shape of the dome, although the system would have permitted this, for they took care to keep the keys of the transverse and side arches lower than those of the diagonal arches, so as to preserve to the structure that form of the calotte, that seemed to them necessary for stability.

The principle of the dome regarded as generatrix of cross v vaults appears to us too important no to insist on it. Thus (7) let this be an apsidal vault on a quarter sphere, whose plan is dotted at a a, the vault called "cul-de-four"(half dome), and so frequently employed by the Romans and during the

Note 1.p.141. Surpaugh is some years behind Ile-de-France, and the vaults of the chain of Tracing correspond in construction to those (old ones) of the cathedral of Noyon, that date from the middle of the 12 th century.

The projections of the great vaults of the choir of the ca-

Romanesque period. Assume that we divide this half dome into 5 parts (see plan A), that reserving only the sides c b d, we remove between these sides the triangles e d b, e b b, etc.; we shall have the perspective Fig. traced at B. It is clear that we can vault these vacant triangles, either by means of a round side arch C, or of a pointed side arch D, whose crown E is lower than the crown F, or by means of a pointed side a arch with its crown G on a level with f. What we have indicated in a single Fig., several years were necessary to accomplish. The high vaults of the abbey church of Vezelay are built according to Fig. C; they date from about 1190. Those of the cathedral of Paris of the beginning of the 12 th century are according to the sketch D (1180). Those of the churches of the beginning of the 13 th century are according to the sketch G.[1] As the diagonal (round) arch b d is longer than the transverse arch c d, when they desired to have the crowns of those t transverse arches at the level of those of the diagonal arches, it was necessary to adopt the pointed form of the first, as seen at H. It is evident that on these sides retained from the dome, they have not dared to place all the weight of the compartments. The architects in leaving the crowns of the side arches at a level below that of the crowns of the diagonal arches, then thought to rest a part of the weight if the compartments or triangular fillings on the walls, and they were mistaken; but they soon recognized that this construction had its inconveniences; it tended to overthrow the side arches ou outside. This was a compromise between the antique construction and that newly introduced, that was to arrest for some t time the developments of the art of the 13 th century; besides it was simpler to regard the arches retained from the dome as resistant points, and then to resis solidly the thrust by those sides; this is what was soon done:- 1, by adopting the pointed arch for the side arches. 2, by raising their crowns to the level of the crowns of the diagonal arches, as indicated by Fig. 7 at G.

Note 1.p.434. Burgundy is some years behind Ile-de-France, and the vaults of the choir of Vezelay correspond in construction to those (old ones) of the cathedral of Noyon, that date from the middle of the 12 th century.

The projections of the great vaults of the choir of the ca-

cathedral of Paris that we have drawn (fig. 6) seen as in B D F G a nearly square vault, composed of two diagonal arches B F, D G, two transverse arches B D, F G, as lateral-ribs transverse arch T T, and four side arches B T, T D, D T, T F. During the arrangement of the vaults on a square plan of the side aisles, points of massure at B, T, D, T, D, on the one hand, and the projection of the bays on the other, the corresponding radius to points of that line two diagonal ascis- ds D D, T T, on which must rest the fillings of compartments, they lie not quite also these diagonals must not intersect in very nearly at a right angle, if not exactly so. Thus from a square bay vaults, regular cross diagonal arches on the alter- nate points of support; but as soon to insert the surfaces of the fillings as to distinctly their weight on all the piers, these constructors intersected this cross vault by the inter- mediate transverse arch X I.

Here then (1) is real that complication produced. The idea with corresponding circular projection was still the generation of this vault. In fact then are diagonal projection A), are diagonal arches as, c d, are raising the main sections resu- ral from the idea; only the ribs of the new being on the two materials a b, c d, the intermediate transverse arch tar- ed from the pier a to the pier f particular vaulting each of the principles a d e, c b e, or each of the diagonals a c, e d e, c f e, f b e. Imagined of two side arches a d, c b, were obtained four side arches a e, e d, c f, f b. The correspondence fail. C exclusive this system. Under the imaginary plan of the tone is visible. The two diagonal arches C E, E F, are the last great; the intermediate transverse arch I E, instead of point a separate section of the tone, like the diagonal arches, has been transferred from I to I' and from F to F' the cross assists the level of the crown I of the diagonal arches; the assistor point assistance, in the principle remaining r rod have been turned the compartments T', that rest on the diagonal arches and transverse arches, and that are groined on the side arches C. This system also offers the advantage of relaxing that laterally connects the side arches in the vault- ed itself of the vault.

But it was scarcely logical were having coins of centers of equal strength at a a f, to support one transverse and two a

cathedral of Paris that we have drawn (Fig. 6) show us in B D F G a nearly square vault, composed of two diagonal arches B G, D F, two transverse arches B D, F G, an intermediate transverse arch K L, and four side arches B K, K F, D I, I G. Having the arrangement of the vaults on a square plan of the side aisles, points of support at B, K, F, D, I, G, on the one hand, and the tradition of the dome on the other, the constructors seeking to retain of that dome two diagonal sections B G, D F, on which must rest the fillings or compartments, they did not think that these diagonals must not intersect we very nearly at a right angle, if not exactly so. Thus then sp spanned two bays, resting these diagonal arches on the alternate points of support; but as much to lessen the surfaces of the fillings as to distribute their weight on all the piers, these constructors intersected this cross vault by the intermediate transverse arch K I.

Here then (8) is what that combination produced. The dome w with horizontal circular projection was still the generatrix of this vault. In fact (see the horizontal projection A), the diagonal arches ab, c d, are nothing more than sections reserved from the dome; only the walls of the nave being on the two parallels a d, c b, the intermediate transverse arch turned from the pier e to the pier f permitted vaulting each of the triangles a d g, c b g, by means of two compartments a e g, e d g, c f g, f b g. Instead of two side arches a d, c b, were obtained four side arches a e, e d, c f, f b. The perspective Fig. B explains this system. There the imaginary plan of the dome is visible. The two diagonal arches C D, E F, are its l last traces; the intermediate transveese arch G H, instead of being a separate section of the dome, like the diagonal arches, has been transferred from G to G′ and from H′ to H; its crown attains the level of the crown I of the diagonal arches; then the skeleton being established, in the triangles remaining v void have been turned the compartments K′, that rest on the diagonal arches and transverse arches, and that are traced by the side arches L. This system also offers the advantage of admitting light laterally beneath the side arches in the height itself of the vault.

But it was scarcely logical when having points of support of equal strength at a e d, to support one transveese and two d

diagonal arches on the sides a b, while the chord c was only loaded by a transverse arch. Very about 1270 was adopted a system of utilizing the great vaults in very obtuse bays, longitudinally all the piers. Thus were constructed the side vaults of the naves of the ambulatories of Laines and of Saint-Yet but the zone is too numerous principle as for the crossing vaults. In the octagonal of Amiens the diagonal arches are round or very liable nervous, or necessary; but in that of S Pierre the transverse zone of the diagonal arches is traced on an unilateral triangle, and the drawing of these vaults is as simple as perfectly reasons.

At A (9) is given the horizontal projection of one of those nine vaults; the piers being at a b c d, the axes of those three five elliptic joints of the two diagonal arches a d, b c, or rather the diagonal arches are the diagonals of a rectangular parallelogram, those ribs fall on the axes of the piers. These diagonal arches are the ordinates generated from a line, whose horizontal trace is given by the circle i j i'j', and m whose vertical section is the ordinal curve k l k'l', correspondent a triangle whose base is to its height as 12:10. -- The equation that the curve is given by the extrados. -- The extrados of the diagonal arches revolved into a f g circumference as unilateral triangle; the extrados of the side arches revolved into a m n isosceles circumference as unilateral triangle; the crown m of these side arches obtains the level q of the diagonal arches, so that their springings are raised to m n. Those side arches are further the arcuvolts of the windows. This the results of the principle of the so-called Gothic ribs vaults really become simplified. The drawing could already be indicated about 1270 by a simple formula. However in the unilateral triangle was rarely employed for tracing the direct diagonal arches of vaults; it was rather adopted for the side arches, where barrelvaults were horizontally raised. (Arc. Construction).

Villars de Honnecourt,[1] among his architecture traces Fig. 10, towards which he inscribes the following latent (see here), which signifies: "Ty pais whos dis aris tires ligne de ers-ne ris a mielle cominge of ses cocasses." Latest aim the radius A B as trace the semicircle C B D. Setting the point of the compasses at D, with the same radius as trace the cir-

diagonal arches on the piers a d, while the pier e was only loaded by a transverse arch. They about 1230 was adopted a system of building the great vaults in very oblong bays, loading equally all the piers. Thus were constructed the high vaults of the naves of the cathedrals of Amiens and of Rheims; yet the dome is the generating principle as for the preceding vaults. In the cathedral of Amiens the diagonal arches are round or very little pointed, if necessary; but in that of R Rheims the generating dome of the diagonal arches is traced on an equilateral triangle, and the drawing of those vaults is as simple as profoundly reasoned.

At A (9) is given the horizontal projection of one of those high vaults; the piers being at a b c d, the axes of those piers give starting points of the two diagonal arches a d, b c, or rather the diagonal arches are the diagonals of a rectangular parallellogram, whose angles fall on the axes of the piers. These diagonal arches are the sections reserved from a dome, whose horizontal trace is given by the circle i j i′j′, and whose vertical section is the pointed curve k l k′l′, circumscribing a triangle whose base is to its height as 13:10. -- One notes that the curve is given by the extrados. -- The extrados of the diagonal arches revolved into e f g circumscribes an equilateral triangle; the extrados of the side arches revolved into h m n likewise circumscribes an equilateral triangle; the crown w of these side arches attains the level g of the diagonal arches, so that their springings are raised to m h. Those side arches are further the archivolts of the windows. Thus the results of the principle of the so-called Gothic cross vault rapidly become simplified. The drawings could already be indicated about 1230 by a simple formula. However the equilateral triangle was rarely employed for tracing the great diagonal arches of vaults; it was rather adopted for the side arches, whose springings were necessarily raised. (Art. Construction).

Villars of Honnecourt,[1] among his sketches traces Fig. 10, beneath which he inscribes the following legend (see text), which signifies; "By this means one makes three kinds of arches with a single opening of the compasses." Indeed with the radius A B we trace the semicircle C B D. Setting the point of the compasses at C, with the same radius we trace the poin-

pointed arch A C E circumscribing an equilateral triangle. Dr Dropping from the point E a perpendicular to the base line, t the point F of intersection bisects the radius A C. Placing the point of the compasses at F, with the same radius we trace the arch G C R. The centers of the pointed arch G C H will be on the points F A, that divide the base C G into three equal parts. To this arch the authors have given the name of "tiers point." (Third point).[1] Now the architects of the middle ages did not always find areas sufficiently large to be able to trace completely the diagrams of the arches of their vaults at full size; indeed one understands that when it was necessarw to erect a cathedral like those of Amiens or of Rheims, it would have been necessary for drawing at full size all diagrams simultaneously needed, an area larger than that occupied by the monument itself. They then forced to seek means for dr drawing and occupying little space, yet presenting rigorous a accuracy. The Album of Villahs of Honnecourt indicates several methods suitable for drawing voussoirs of arches without the aid of a diagram of the whole, and this lack of space for making the diagrams compelled the architects to adopt certain pointed arches traced according to a geometrical formula. T Thus these architects adopted by preference, after the middle of the 13 th century, three pointed arches:- 1, the pointed arch generated by the equilateral triangle; 2, the pointed t third-point arch; 3, the pointed fifth-point arch. The tracing of diagonal arches obtained by placing the centres on two points dividing the base, on three, four, five, six, seven or e eight, permitted the making of a rigorous diagram, without i its beiug necessary to draw the entire half arch. Let (11) at A be a pointed arch generated by an equilateral triangle; it is evident that the radius a b equals the base a d; that if w we trace the quadrant d o, the segment b o will be half the segment d b, since the equilateral triangle divides the circle into six equal parts. The crown b is then the third point of the qsadrant divided in three equal segments; this is the reason that sometimes the name of "arc-en-tiers-point" (third point arch) is given to the equilateral arch, i.e., the arch whose prow falls on the third point of the quadrant divided in three equal parts. Let B be the pointed arch to which the name of third point should be applied in preference to any ot

[illegible] divided into three equal parts, and
base can be divided in six equal parts, but the perpendicular
dropped from the crown of the arch on the base will divide it
into two equal parts; then the radius f' r' having four of these
parts, the radius f' d will contain four also. We begin by
that to trace the diagram of the voussoirs of the pointed ar-
ch f', we take only the space f' r' of the base a three times,
we take one sixth that we trace on r'c' (Fig. 3); on the base
r'f' from the point r' we erect a perpendicular f'r'; then to-
ring a radius f'r' having first taken the length of f'f', we
in the point of the half diameter of the arch, and placing the
point of the "compasses" (circle 3) on f', the intersec-
tion of the line f'r' with the perpendicular r'r' will give the
point r', the centre of the pointed arch. We then trace a part-
ion of the arch r'f. Now the width of the voussoirs i is not
trace the joints to the of these voussoirs. All the voussoirs
of the arch will then be given by this i m n o, and we can
take as many times towards to be put. In reading to trace
the intrados or rather the half intrados, where pointed arches
have a line at the crown, the projections of the voussoir-
lar f'r' will lie in the position of this half intrados, as
indicated in our fig. But we will have another mode of obta-
ining the intrados. (See sketch 3). Let the line m n be the
ch of the voussoirs; we divide it into four parts; drawing
from the point m by means of a compass an angle o r a equal to
the angle f'r r, we shall have on the n m a distance o r equal
to one of the four parts of the chord line m o; we join the
point o to the point r, and shall have traced the triangle
o m r to add to the pattern to form the pattern for the half
intrados. To draw the pattern for the voussoirs of the fifth
join arch represented at 3, one proceeds in the same manner;
only the base of the arch being divided into five equal parts,
we shall take 1 1/2 of those parts to commence the operation
and take 4 for radius. It was then not by chance that the con-
structors of the middle ages in tracing their arches, took a
the centre on the base or prismatic line of these arches, a
and as proof that their method of tracing partial diagrams,
one can observe that the voussoirs having been cut without k
towing exactly the number necessary for each branch of the
arch, or the length of the soffit, it often happened in clas-

other, the base c e being divided into three equal parts, that base can be divided in six equal parts, and the perpendicular dropped from the crown of the arch on the base will divide it into two equal parts; then the radius f e having four of those parts, the radius f g will contain four also. Now assuming th that to trace the diagram of the voussoirs of the pointed arch B, we have only the space f B g; the base c e being known, we take one sixth that we trace on B′f′ (Fig. C); on the base B′f′ from the point B″we erect a perpendicular B″g′; then taking a radius f′g′ having four times the length of B′f′, which is one third of the half diameter of the arch, and placing the point of the "troussequin" (triangle ?) at f′, the intersection of the line f′g′ with the perpendicular B″g′ will give the point g′, the crown of the pointed arch. W can trace a portion of the arch g′i, give the depth of the voussoirs i k′ and trace the joints to one of these voussoirs. All the voussoirs of the arch will then be given by this l m n o, and we can by this pa tern cause thousands to be cut. It remains to trace t the keystone or rather the half keystone, since pointed arches have a join at the crown. The prolongation of the perpendicular B″g′ will give us the pattern of this half keystone, as indicated in our Fig. But we still have another means of obtaining its pattern. (See sketch D). Let the line p q be the depth of the voussoirs; we divide it into four parts; drawing from the point g by means of a sector an angle q r s equal to the angle f′n t, we shall take on the q s a distance q v equal to one of the four parts of the depth line p q; we join the point p to the point v, and shall have traced the triangle p q v to add to the pattern to form the pattenr for the half keystone. To draw the pattern for the voussoirs of the fifth poin arch represented at G, one proceeds in the same manner; only the base of the arch being divided into five equal parts, we shall take 1 1/2 of those parts to commence the operation and take 4 for radius. It was then not by chance that the constructors of the middle ages in tracing their arches, took t the centres on the base or springing line of those arches, a and as proof that their method of drawing partial diagrams, one can observe that the voussoirs having been cut without k knowing exactly the number necessary for each branch of the arch, or the length of the soffit, it often happened in clos-

closing the arch, that was set a very wide half keystone or a last voussoir made thinner than the others.

Note 1.p.437. Album of Villars od Honnecourt. See the French and English editions. Plate XI.

Note 1.p.439. This name seems to us perfectly applicable indeed to that sort of arch, since the point of the compasses is placed on the third dividing point of the base. Still the equilateral arch is also frequently called third-point (in French). We shall see for what reason.

But a singular fig. drawn in the Album of Villars of Honnecourt, gives us the key to an entire system of drawing arches for an entire edifice, and as in the preceding example, allows the making of partial diagrams with rigorous accuracy, and wi without requiring very large areas.[1] Plate 39 of that Album s shows us the voussoir of a third-point arch drawn according to the preceding method, and then a spiral intersected by a straight line passing through its eye. Above this sketch is read:- "By this means one cuts a voussoir of the fifth-point." The text does not refer to the drawing of that voussoir, but the presence of that spiral, drawn there as a simple memorandum, evidently relates to the drawing of arches generated by a division of the diameter into five. This sketch is reproduced exactly by the full line and our Fig. 12.[1] On a base A B divided into five equal parts giving six points, from the middle C as centre is drawn the semicircle A B. -- One will note that this point C divides the division 3 4 into two equal parts. -- Then taking the point 3 as centre and 3 A as radius, the second semicircle A 5 is drawn. Replacing the point of t the compasses on C aud taking C 5 as radius, the third semicircle 2 5 is drawn. Replacing the point of the compasses on 3 and taking 3 2 as radius, the fourth semicircle 2 4 is drawn. Finally, placing the point of the compasses on C and taking C 4 as radius, we draw the fifth semicircle 3 4. If from the two centres 3 and C, that have served for drawing the semicircles, we erect the two perpendiculars 3 a, C b, we cut those semicircles at a, c, b and d. Assuming that the diagonal arches of a great rectangular vault of the nave be the round arch of which A B is the diameter, the transverse arches having b a base comprising four parts or the length A 5, those transverse arches consist of one branch of the arch A a and of a s

middle point of the part 2 3. The transverse arch will be drawn by means of two circular arcs, whose radius will be O A, and whose centre O and A will be diametral points at the diameter A 5, in eight equal parts. The diameter of the diagonal arch having five parts and the transverse arch four (see the preceding proposition 8), the side arch will have parts. For the side arch O a fourth a radius equal with the transverse arch 1 2. If 1/2 is the base of the transverse arch, 4, to the base of the side arch 3, the hypotenuse m n or base of one of the diagonal arches will have 5, because the square of 4 is 16, of 3 is 9, so that 16 + 9 = 25, which is the square of 5. Then A B being the base of the diagonal arch of a vault with transverse arch in 6 5, the side arch will have the intersection three parts, and we shall have drawn the diagonal, transverse and side arches of the vault with the same number of the divisions: the triangle points of the two A B having given us at O the centre of the diagonal arches, at O 2 the centre of the transverse arch, at O 3 the centre of the side arch. Temporarily the vaults circular arch arches to form three arches arches, all the centers of the springs of these arches can be set from a single diameter or part of a diameter, assuming that is easily the proportions indicated at O (11). If we wish to draw a narrower vault, i.e., a vault where the rise of the side arches is half the base of the transverse arch, we shall then have in geometrical proportion the trace I o o n. (See fig. 11). Then the diagonal arch m o will have for diameter 4 1/2 parts. That diagonal arch will then be joined, a curve whose diameter is A 3 and centres a are the points 3 and 2. The transverse arch will have the diameter as before A 5, and for centres a, O, and the side arch will have as diameter either 2 4 or 3 5, and for centres either e O or e 3; in the first case this side arch will be drawn with a smaller opening of the compasses than that used for the transverse and diagonal arches described in the preceding, it will be drawn with the same opening of the compasses. If we divide the transverse under the side arch into two openings, each will have a part of any kind (1 or 2 4; and the number of such arches arches arch-in 3 will be 4 and 4, and that arch will be equilateral. If the side arch of the

second branch of the arch 5 a, whose centre will be e, the m middle point of the part 2 3. The transverse arch will be drawn by means of two circular arcs, whose radius will be C A, and whose centres C and e will be dividing points of the diameter A 5 in eight equal parts. The diameter of the diagonal arch having five parts and the transverse arch four (see the horizontal projection H), the side arch will have three parts, for the side arch 1 m forming a right augle with the transverse arch 1 n, if we give to the base of that transverse arch 4, to the base of the side arch 3, the hypothenuse m n or base of one of the diagonal arches will have 5, because the square of 4 is 16, of 3 is 9, so that 16 + 9 = 25, which is the square of 5. Then A B being the base of the diagonal arch of a v vault whose transverse arch is A 5, the side arch will haveas base 3 B comprising three parts, and we shall have drawn the diagonal, transverse and side arches of the vault with the s same opening of the compasses; the dividing points of the base A B having given us at C the centre of the diagonal arches, at C e the centres of the transverse arch, at C f the centres of the side arch. Consequently the same circular arcs serving to trace these three arches, all the patterns of the voussoirs of these arches can be cut from a single diagram or part of a diagram, assuming that we apply the procedure indicated at D (11). If we wish to trace a narrower vault, i.e., a vault where the base of the side arches is half the base of the t transvers arch, we shall then have in horizontal projection the trace 1 p q n. (See Fig. 11). Then the diagonal arch n p will have for diameter 4 1/2 parts. That diagonal arch will then be pointed, a curve whose diameter is A f and centres a are the points 3 and C. The transverse arch will have as diameter as before A 5, and for centres e, C, and the side arch will have as diameter either 2 4 or 3 5, and for centres either e C or e f; in the first case this side arch will be drawn with a smaller opening of the compasses than that used for t tracing the diagonal and transverse arches; in the second, it will be drawn with the same opening of the compasses. If we divide the tympanum under the side arch into twin openings, each will have a part of the base A B or 3 4; and the centre of each of these arches whose croun is d will be at 3 and at 4, and that arch will be equilateral. If the side arch of the

Note 1.p.441. The use of this fig., that is not explained in the French edition of Villers of Monnecourt, is of capital importance in attempts of the engineers to see further into the old modes of work, building in very compact cities, o could not arrange aqueducts or drains of great extent. In theory one accurately compares these affinities, but in practice they have such importance, that they compel the architects that desire to respect their structures to be aware before hand, to adopt methods that influence the form adopted.

Note 1.p.442. The dotted lines, numbers and letters were placed by us to explain the use of this fig.

rectangular vault l n m r, having for base 3 B and for centres C f, seems to us too sharp, we can substitute for it the arch whose base is 2 5, its crown is b and centres are 3 4. Thus o one understands, that by the aid of this Fig., the bases of a all the arches of a vault always giving equal divisions known thus as the radii of these arches, they can be cut by the aid of a partial diagram occupying a very small area. And indeed, if we examine gothic churches built during the 13 th century, we shall recognize tha all the diagonal, transverse and side arches, that the archivolts, bays and galleries, etc., are d drawn by means of centres placed on equal divisions into five or six of the diameter of the circle. It seems unnecessary to insist further on the importance of the spiral Fig. contained in the Album of Villars of Honnecourt, but it is not inappropriate to remark, that the rectangular vault l m n r, whose h horizontal projection is drawn at H, is derived from the triangle given by Plutarch as being the perfect triangle of the Egyptians, and that the transverse arch, whose diameter is A 5 divided into four, has a rise 3 a divided in 2 1/2 less a very small fraction, i.e., that it circumscribes a triangle very similar to that given by the vertical section of the great pyramid of Cheops. The pointed arch then merits some attention; it is not only a motive of stability that has caused its adoption, but also a feeling of proportion and of harmonious accord between all curves of the vaults; it is a necessity resulting from practice in tracing the diagrams; it is especially a need of liberty in the construction of these vaults, whose excellent principle one cannot too thoroughly study, s since it permits all combinations.

Note 1.p.441. The use of this Fig., that is not explained in the French edition of Villars of Honnecourt, is of capital importance in presence of the monuments. Do not forget that the old masters of works, building in very compact cities, c could not arrange workyards or areas of great extent. In theory one scarcely considers these difficulties, but in practice they have such importance, that they compel the architects that adhere to causing their diagrams to be drawn before them, to adopt methods that influence the forms adopted.

Note 1.p.442. The dotted lines, numbers and letters were p placed by us to explain the use of this Fig.

For twenty years have been made many imitations of Gothic c construction; these imitations very rarely satisfy the eyes; this indeed is because those that erect them, further admiring much our old monuments, have probably never taken the trouble to seek therein the judicious elements. In architecture taste and feeling are much; but to depend on them it is necessary to use the compasses and geometrw. One sees that by means of the firmula (12), there is but one of the pointed arches which has its centres outside its springings.

Indeed in those beautiful schools of Ile-de-France, Champagne and Soissonais, the architects as men of taste felt that the last limit of sharpness of the pointed arch was the equilateral; that the centres of the branches of the arch placed outside the springings give a pointed arlh, whose extreme sharpness is offensive, a disagreeable proportion, because the ratio of the base to the height exceeds the equilateral triangle. (Art. Proportion). But the Normans and Anglo-Normans we were less refined and sought in their construction before all else formulas, that arsume simple practical means. Thes instead of attempting as in Fig. 12, to find pointed arches of d different spans having all angles equal at the vertex, or at least nearly similar, analogous ratios between the diameter and rises, these practical peoples of the North, good constructors from the beginning, were but moderately preoccupied w with proportional ratios and choice of forms; they desired an expeditious method. We have seen how Villars of Honnecourt g gave the means of drawing a round and several pointed arches with the"same opening of the compasses." Now the Norman vaults erected about 1220 frequently present an arrangement, such t that all the arches, diagonal, transverse and side, as well as archivolts, are drawn with the same radius.

Thus (13) let this be the horizontal projection of one of these vaults, the generating arch is the diagonal arch, that is round and revolved down in A B C. The transverse arch at C revolved in A C S is drawn with the radius a b equal to the radius O C. The transverse arch D E intersecting the diagonal arches revolved in D E F is traded the same with the radius e f equal to the radius O C, its crown F naturally being at the level C of the crown of the diagonal arches. Let i K and l m be the thickness of the piers, the side arches being comprised

between X and I. These arcs arches revolved in X I p are still drawn with a radius equal to the radius O C, their springings being raised from A to B, V. If it be desired have the crown of the side arches attain the level of the crowns of the diagonal arches. If lower side arches serve as abutments for the cross-arch divided by a million, still the radius a p equal to the radius O C will serve to draw the arches dividing the window.

Except for the keystones, the drawing of a single voussoir of an arch from matrices for making the patterns of all the arches of the vault, arrangements, springs, etc. All this is the effect of if we divide a diameter of a diagonal arch into 5 or six, with the same opening of the compasses, we can have a rise of arches, whose diameters will be that of the semicircle, that is the primary arc of the vault or the diagonal arch, as three, two or one are to four, or as nine, eight, 8 seven, six, etc., are to ten. Then having all the voussoirs and of the same arc, and their or fraction of a base, we can without a diagram erect all the arches of an edifice. Then we correspondingly are noting, that means are adopted of the point-ed arch called lancet; it was an economy of trouble, all com-bination of diagrams and difficulties was avoided, and it was on-ly necessary to give the section of each arch according to its function. Further, all lines can be made structure (on the wrought), they cost their place according to the first dec-ination. If diagrams were necessary, this was only for wood-en centres, but which these arches were all erected by the aid of the same radius, the diagram of the semicircle or of the diagonal arch provided for ribbed in line all other centres, since it sufficed to know the ratio existing between the diam-eters of these arches and that of the semicircle to have a c omplete drawing of each, as shown by Fig. 13 at C.[1]

Note 1.p.442. By having to rebuild arches of Gothic vaults, we have been led to recognize this unity of curvature for ma-ny of them in the same edifice, whatever the spans of these arches, for the curves of the wooden centres out for one ner-ves for everyone only the diagonal of this trunk [illegible] in [illegible] lines.

The one complete from the crescent-; this has adjusted a arch was at first as inscribed from the Triangle; ", this and drawing in the vault, in a derivative given by a principle of

between K and l. These side arches revolved in K l p are still drawn with a radius equal to the radius O C, their springings being raised from K to V, if it be desired that the crowns of the side arches attain the level of the crowns of the diagonal arches. If these side arches serve as archivolts for the openings divided by a mullion, still the radius n q equal to the radius O C will serve to draw the arches dividing the window.

Except for the keysones, the drawing of a single voussoir of an arch then suffices for cutting the patterns of all the arches of the vaults, archivolts, openings, etc. And (see the sketch G) if we divide a diameter of a diagonal arch into fou or six, with the same opening of the compasses, we can have a series of arches, whose diameters will be that of the semicircle, which is the greatest arch of the vault or the diagonal arch, as three, two or one are to four, or as nine, eight, s seven, six, etc., are to ten. Then having all the voussoirs cut on the same arc, and base or fraction of a base, we can without a diagram erect all the arches of an edifice. Then one comprehends the motive, that caused the adoption of the pointed arch called lancet; it was an economy of drawing, all complication of diagrams and patterns was avoided, and it was only necessary to give the section of each arch according to its function. Further, all being cut to the sage curvature (on the extrados), they took their places according to the given designation. If diagrams were necessary, this was only for wooden centres, and again these arches were all traced by the aid of the same radius, the diagram of the semicircle or of the diagonal arch permitted the placing in line all other centres, since it sufficed to know the ratio existing between the diameters of these arches and that of the semicircle to have a c complete drawing of each, as shown by Fig. 13 at G.[1]

Note 1.p.446. By having to rebuild arches of Gothic vaults, we have been led to recognize this unity of curvature for many of them in the same edifice, whatever the spans of these arches, for the curves of the wooden centres cut for one served for several; only the segment of each branch was more or less long.

One can conclude from the preceding:- 1, that the pointed a arch was at first an importation from the Orient; 2, that being adopted in the East, as a curvature given by a principle of

Note 2.p.416. In our Entretiens sur l'Architecture. (3 th).

Note 1.p.417. See 3 th Entretien sur l'Architecture et l'ant. (Prosperities).

QUAQUIL. Factory. Chicago.

A little chapel erected on the site of an event regarded as miraculous, or to preserve a religious remembrance. The name of oratory is also given to certain chapels dependent on the parishes of a county, village or manor. Was still built oratories in the middle ages small lateral chapels attached to the first chapels of nearing, and used were intended for the meditations and simply relatives.

In the Bibliotheque de Paris, Chapel medieval oratory in oratories built on the places where S. Germain stopped to pray or to instruct the people. The old abbeys consisted oratories the principal church, oratories present in several places in the monastery. In parishes the monastic localized or very old oratories, in 1094 were remain the little chapels if S.

proportion explained elsewhere,[2] this pointed arch in France was the starting point of an entire system of perfectly logical construction, allowing great liberty in application; 3, that consequently the pointed arch as a form probably belonged to the school of Alexandria and to the Nestorians, who appear first to have adopted it; but that as the principle of a new system of vaults, it without doubt belongs to our provinces north of the Loire, since in 1140 in the abbey church of S. Denis, the constructions erected by Suger allow round arches to appear only for diagonal arches, and that already is ap applied the system of vaults, that we see developed in the ca cathedral of Paris twenty years later. Now nowhere in Europe nor in the East in the middle of the 12 th century, were constructed vaults haviug some points of similarity, like the use of the pointed arch, to these of the church of S. Denis and of the cathedral of Paris. If then the pointed arch then originated outside France as a form of arch, we were first to apply it to one of the most fruitful inventions in the history of construction. If indeed the pointed arch started outside france, we were the first who knew how to derive from that f form, the result of a feeling for proportion,[1] results of considerab e value, since thew have produced the only original architecture, that has appeared since antiquity.

Note 2.p.446. In our Entretiens sur l'architecture. (9 th).

Note 1.p.447. See 9 th Entretien sur l'architecture et l' art. (Proportion).

ORATOIRE. Oratory. Chapel.

A little chapel erected on the site of an event regarded as miraculous, or to preserve a religious remebrance. The name of oratory is also given to certain chapels dependent on the apartments of a castle, palace or mansion. Men still called oratories in the middle ages small tapestry chambers erected in the great chapels of castles, aud that were intended for t the castellans and their relatives.

In his Histoire du diocese de Paris,[2] Lebeuf mentions certain oratories built on the places where S. Germain stopped to pray or to instruct the people. The old abbeys possessed besides the principal church, oratories erected in several places in the enclosure. To perpetuate the memories recalled by very old oratories, in 1034 were rebuilt the little chapels if S.

Martial at Paris, that a fire had destroyed.[3] Most of the conasteries had their origin in merely an oratory erected in the midst of a desert and around which cenobites came to establish themselves. S. Clement thus built an oratory in a place called Gorze near Metz, that soon became the centre of a great monastery.[4] An oratory had been erected opposite the monastery of Sennoul to deposit there the relics of S. Simeon. When he retired in his oratory at Vienne in Dauphiny, archbishop Turpin or Tulpin learned the death of Charlemagne at Cologne from several devils, who had returned without having been able to carry off the soul of the emperor, they said, if one credits the chronicle of Richer. Charlemagne also caused to be built a great number of oratories, among which it is necessary to cite that of the valley of Moyen-Moustier, erected in honor of S. Denis, and in which was preserved the body of Pope Alexander, martyr, found at Rome. That oratory was paved with mosaic and existed till 1586.[5] At Cluny were still preserved in the last (18 th) century the oratories of S. Odilon and of S. Bernard; i.e., the isolated cells in which those personages habitually staid. It is well understood, that those little chambers were only remarkable ofr their extreme simplicity.

Note 2.p.447. Vol. I. p. 102.

Note 3.p.447. Lepeuf. Vol. II, p. 498.

Note 4.p.447. Chronique de Richer. Vol. II. Chap. 3.

Note 5.p.447. Chronique de Richer. Vol. II. Chap. 9.

Also certain oratories were arranged in the midst of fortresses in the middle ages; placed under the name of a saint e especially venerated in the province, and dopisitory of some of his relics, that protected the defenses.

Thus in the midst of the citx of Villeneuve-les-Avignon, one still sees an oratory of the 12 th century preserved in the middle of an enclosure rebuilt in the 14 th century. Fig. 1 gives the plan of this little chapel, and Fig. 2 is its perspective.

Besides the chapel, common to all companions, castles had one or several oratories belongiug to the apartments of the castellan and his wife. Those oratories were only small retired rooms usually placed in the tower. One shut himself in there to pray, but the divine office was not performed there. It was only in the 14 th century that the oratories of castles

became sometimes actual little chapels in which mass could be said.

In 1365 Charles V caused to be arrenged in the chapel of t the castle of the Louvre a very richly decorated oratory, so as to retire there when he disired to be present at the mass.[1] Mouis XI also caused to be built between two buttresses of the S. Chapelle at Paris the oratory from which he could see the altar through a little skew opening, without being seen by t those present. That oratory still exists, is covered by a tunnel vault and is very simple; it was probably hung with tapistries. On the contrary, the exterior is richly decorated by fine sculptures, and is terminated by a balustrade of Fleur-de-lises with a crowned L at the centre. An oratory is likewise attached to the S. Chapelle of the castle of Vincennes. (Art. Chapelle).

Note 1.p.449. Sauval. Hist. et antiq. de la ville de Paris. Vol. II. p.22.

ORGUE. Organ Front. (Art. Buffet).

OSSUAIRE. Charnel. Ossuary.

A covered structure built in cemeteries to deposit therein the bones found in the consec ated ground when new graves are dug. Formerly all cemeteries possessed a charnel. Sometimes, as at the cemetery of the Innocents at Paris, the charnel was only a cloister under the ceiling of which were successively placed the bones, that the great number of interments uncovered. On the walls of churches and even beside their principal portals were made recesses sheltered by one end of the portico of the cloister, and in these recesses furnished with f fixed gratings were thrown the bones abounding in the soil of cemeteries. An ossuary of that kind (1) existed at one side of the facade of the church of Fleurance. More frequently the charnel formed a sort of chapel pierced by a number of small openings, through which were perceived the bones gradually accumulated in the interior. Brittany still retains a very great number of ossuaries dating from the 15 th and 16 th centuries, and men have not ceased to deposit bones therein; some of these are filled to the roof. When the bones raised by the excavation of new graves belong to the dead that can be named,

the family sculpture the skull of him interred in a small box surrounded by a cross, and there have been placed on the sill of one of the northern chapels of the church. This, I ventured a view of the cemetery of Tamny (Finistère), that is adjoined to the church and looks on the cemetery.

Note s.v.ilk. To see the arrival of this cemetery to a. observ.

In the northern of the Breton provinces, particularly in the Bienne country, we have often seen on the exterior of a few houses of rural character surrounded by their cemetery, which forms towards the walls of the village, is which are generally arranged the skulls dedicated to Christian the monumental soil. Pillars also bearing certain parts of the cross also sometimes served as ossuaries.

The desire to be interred the nearest possible to the church, when this could not be either their walls successively, and the force to approach the foundations "under the eave of the roof." Certain were then morbidly placed behind the buttresses of the nave as if to scarcely the usual view of the trunk. This explains why the porches of churches adjacent to churches were flanked by tells opened in rockwork, a sort of catacomb so the side opposite the nave, in which were piled and the bones crowded to light by the arrival's under masses as or niches whose arrangement is given by Fig. 5. If ossuaries were built outside the churches, they were also necessary in the interior, for the small not were to dust out the bones of the faithful discovered remains. The area the most crowded in the interior of the church only the remains of only persons, the bones from old and unknown interments were placed in little tellers. In certain parts of Brittany, or as we have noticed even, in Wales and in the Massif and valleys so. that ossuaries common among the Celtiques, and we have discovered to repeated all walls of the nearly churches cross walls remarkably filled with bones found, evidently coming from several bodies.

DISLIGHTED. Dungeon.with trap in ceiling.

I have researches was under the floor or walls of a well, into which were larger barrows, but were hastened to disappear. There is no traces of the entire edge in which this ar-

the family encloses the skull of the deceased in a small box surmounted by a cross, and those boxes are placed on the sill of one of the numerous openings of the charnel. Fig. 2 represents a view of the ossuary of Faouet (Finisterre), that is attached to the church and looks on the cemetery.[2]

Note 2.p.449. We owe the drawing of this ossuary to M. Goucherel.

In the churches of the southern provinces, particularly in the Basque country, we have often seen on the exteriors of t the apses of rural churches surrounded by their cemetery, niches formed beneath the sills of the windows, in which are c carefully arranged the skulls gathered in disturbing the consecrated soil. Cellars made beneath certain parts of the church also sometimes served as charnels.

The desire to be interred the nearest possible to the church, when this could not be within their walls themselves, caused the tombs to approach the foundations "under the eave of the roof." Charnels were then habitually placed between the buttresses of the nave as if to satisfy the usual wish of the dying. This explains why the portiços of cloisters attached to churches were pierced by cells opened in recesses, a sort of cupboards on the side opposite the nave, in which were placed the bones brought to light by the sexton's spade; recesses or niches whose arrangement is given by Fig. 1. If charnels were built outside the churches, they were also necessary in the interior, for men would not wish to cast out the bones of the faithful uncovered inside. But some one must exhibit in the interior of the church only the remains of holy personages, the boxes from old and unknown interments were placed in little cellars, in certain parts of crypts, or as we have sometimes seen, in holes cut in the masonry and walled up. That custom was common among the religious, and we have discovered in repairing old walls of the abbey churches these walled recesses entirely filled with human bones, evidently coming from several bodies.

OUBLIETTES. Dungeon with trap in ceiling.

A deep excavation made under the floor or vault of a hall, into which were thrown persons, that were desired to disappear. There is no castle of the middle ages in which these are

not shown, and yet we must confess that we have very rarely found dungeons to which could be given this name; generally what are regarded as such are privies, whose use is easily recognized, however unfamiliar one may be with the art of construction. (Art. Latrines). We have seen in many castles, abbeys and official buildings dungeons, but we know only three "oubliettes" that may reasonably be regarded as such. The first is found in the castle of Chinon, the second in the Bastille, and the third in that of Pierrefonds. It must also be stated that the romances and chronicles of the middle ages often speak of dungeons, but never of "oubliettes" We should n not be indisposed to believe that those of castle Chinon are privies, which would reduce to two the examples cited. "We must w warn our readers" says M. Merimee in the Instructions du comite historique des arts et monuments,[1] "to beware of local traditions attached to the cellars of keeps. Men too frequently give atrocious colors to the middle ages, and the imagination accepts too easily the scenes of horrors, that the romancers locate in such places. How man cellars and storerooms for w wood have been taken for frightful dungeons! How many bones from kitchens have been regarded as the remains of victims of feudal tyranny! With the same reserve it is necessary to examine the dungeons designated by the name of "oubliettes" a s sort of well into which were lowered prisoners destined to die of hunger, or indeed they were slain by casting them from a high place, whose floor fell beneath their feet. Without placing absolutely in doubt the existence of "oubliettes" still one must regard them as very rare, and only accept them when such a purpose is well demonstrated" We are so much the more disposed to consider the "oubliettes" of castle Chinon as the pit of the privies, since the sort of well with square plan that forms it is pierced at about mid-height by a door, that seems to be the way for removal of the sewage, unless admitting tha this door was made to see if the condemned were already dead. As for the "oubliette" of the Bastile, it might p pass for an ice pit. Here is its section (1). It consisted of a hexagonal vaulted room located in the substructure of one of the towers, reached by a little door communicating with a screw stairs; all around that vaulted room was a walk 3.3 ft. wide, at the middle being an inverted cone ending in a little

opening intended to carry away water. It is certain that an unfortunate placed in the bottom of that funnel could neither sit, lie nor stand. It was so minutely that the little C fire was a well size, and that parents lowered by the bottom of such pits were forced into to give them injuries or reflexes. There was a kind of prehistoric torture. But this size might be an ice pit, and it would not be the sole example of a subterranean for ice existing in a castle. Our ancestors lived cool drinks, and the little bottom drain is then well explained. As for the "oubliettes" of the castle of Vincelotte, one cannot doubt their purpose, here is the section (2). They consist of a well excavated in the middle of a room, that was certainly a dungeon, since it contains a cellar in a niche.

Note 1.p. 152. Coll. d. dess. Med. sur l'Mat. d. prisons. Architecture militaire. n. 7a.

One can descend into that dungeon only by a hole 4 pierced at the centre of its vault. We lowered by a cord attached to the ground entry of the room C. Just what also have served as a prison. In that room C is found a trap; it opening light only by a very small opening D. If the orifice of the "oubliette" prisoner; then and was put closed by a trap door, one can believe the attempts of an unfortunate prisoner always feared to fall into that hole, that he could not see, since the dungeon remained in light. The two crenelle, also of the vault and that of the oubliette exactly corresponded, and from the time I saw could pass a hat to fall into the well exposed first making the crenelle to lower his into the oubliette. We have lowered to the bottom of this oubliette; we found the usual hole carved in formation, but in place of a plane stone, as C is the level of the bottom of the sitern, he excavated 4.4 ft. we made of it a well that supplies water for the needs of the castle. In the wall marks which indicate they this, except the well of the oubliette; in one of these dungeons we found some inscrit and with antiquary in her rare. It is plained that it the chasses of Jean also crimi "oubliettes", not we have not been able to verify such too accurately.

Jeanne.. Jurisen. Decaisin. Critica.

Just was the mission of the antiquary to institute in the

opening intended to carry away water. It is certain that an unfortunate placed in the bottom of that funnel could neither sit, lie nor stand. It must be admitted that the little f flue was a soil pipe, and that persons lowered to the bottom of that cell were placed there to give them leisure to reflect. That was a sort of prolonged torture. But this cone might be an ice pit, and it would not be the sole example of a storeroom for ice existing in a castle. Our ancestors loved cool drinks, and the little bottom drain is then well explained. As for the "oubliettes" of the castle of Pierrefonds, one cannot doubt their purpose, here is the section (2). They consist of a well excavated in the middle of a room, that was certainly a dungeon, since it contains a privy in a niche.

Note 1.p. 452. Coll. d. docs. ined. sur l'hist. d. France. Architecture militaire. p. 74.

One can descend into that dungeon only by a hole A pierced at the centre of its vault. He descends by a screw stairs from the ground story of the room C, that must also have served as a prison. To that room C is added a privy; it receives light only by a very small opening D. If the orifice of the "oubliette" remained open and was not closed by a trap door, one conceives the situation of an unfortunate prisoner always fearing to fall into that hole, that he could not see, since the dungeon received no light. The two openings, that of the vault and that of the oubliette exactly corresponded, and from the trap A one could cause a man to fall into the well without first taking the trouble to lower him into the oubliette. We have descended to the bottom of this oubliette; we found the wheel that served as foundation, but no trace of a human being. At B is the level of the bottom of the ditch. By excavating 6.6 ft. we made of it a well that supplies water for the needs of the castle. In the same castle exist other dungeons like this, except the well of the oubliette; in one of these dungeons we found names incised and rude sculptures on the surfaces. It is claimed that at the chateau of Blois also existed "oubliettes", but we have not been able to verify their form accurately.

OUVRIER.. Workman. Mechanic. Artizan.

What was the situation of the workman on buildings in the

ability alone? Such measures is difficult to seize. Before the
regular establishment of skills about the middle of the 17 th
century, was the workman free like those of our time, or did
he form a part of a serfs, serving masters and related to a
part of jurisdiction exercised by his master the seigneurs?
Marks like are found in the shape of the value of our commo-
dity of use if to be and the material of the 19 th centuries in
Ile-de-France, Normandie, Champagne, a part of Gascogne,
Lorraine and the provinces of the Jura, "Finally there was
no lower the working apprentices were not paid in the day, o
but by the piece. Inferior to the mode of consumption of m
that epoch, the surface mines were partly through slaves, and
were merely place of nearly equal kinship, the whole masonry
point had for to the master of serve by the superficial water
(di ex. Ib.), and the one whose industrial basis and joints by
the coins to the matter. That is earth made blood on the v
violets face, so that one could estimate the value of the work
that he had done.

It was indeed so clearly that the corvees were free, i.e.,
that he could do work or in a mark, could be molded or leave
the part as practical color. But about the middle of the 17
th century, when the relatives of Nance Colleen were not
in force, this mode of working must have been modified.

The workman must first model in the measures of the guild
of which they formed a part; the wages were regulated by the
masters, and much efficient minter could have only one. Man
or large apprentices under his orders, was choosing in rela-
tion to the master of work and to her here Journeyman Maria
with him one or more helpers.

Then the wages were regulated by the day's work of the Jour-
neyman and helpers, and most Journeyman made having a work of
partial contractor commission in the general contracting, on
account of a wage agreed on and regulated for a certain part.
This the accessories' marks are no longer seen on our monum-
ents of the masters of the royal domain after the middle of
the 19 th century.

The master of the craft, charged with the conception and e-
xecution of the work, found himself at the same time the prea-
lator of the wages, assuming just as we do today, a certain
portion, vaile, crar, part of a mail, to a certain journeyman.

middle ages? That question is difficult to solve. Before the regular establishment of guilds about the middle of the 13 th century, was the workman free like those of our time, or did he form a part of a corps, obeying statutes and subject to a sort of jurisdiction exercised by his peers? The stonecutters' marks that are found on the stones of the walls of our monuments of the 12 th and the beginning of the 13 th centuries in Ile-de-France, Soissonais, Beauvoisois, a part of Champagne, Burgundy and the provinces of the West, evidently prove that at least the working stonecutters were not paid by the day, b but by the piece. According to the mode of construction of th that epoch, the surface stones were rarely through stones, and were merely slabs of nearly equal thickness, the stone masonry being paid for to the master of works by the superficial toise (41 sq. ft.), and the cut stone including beds and joints by the toise to the workmen. Thus he marked each block on its v visible face, so that one could estimate the value of the work that he had done.

It must indeed be admitted that the workmen were free, i.e., that he could do more or less work, could be engaged or leave the yard as practised today. But about the middle of the 13 th century, when the regulations of Etienne Boileau were put in force, this mode of working must have been modified.

The workmen must first submit to the statutes of the guild of which they formed a part; the wages were regulated by the masters, and each affiliated master could have only one, two or three apprentices under his orders, thus becoming in relation to the master of works what we now term a journeyman having with him one or more helpers.

Then the wages were regulated by the day's work of the journeyman and helpers, and each journeyman thus became a sort of partial contractor combining in the general undertaking, on account of a wage agreed on and regulated for a certain part. Thus the stonecutters' marks are no longer seen on our monuments of the provinces of the royal domain after the middle of the 13 th century.

The master of the works, charged with the conception and direction of the work, found himself at the same time the regulator of the wages, assigning just as we do today, a certain portion, vault, pier, part of a wall, to a certain journeyman.

This exclaims in the same article cause differences in exces-
sive market in a river or river, from one day to another, pers-
air variations in availible, etc. The materials trend empir-
ed by the water, they were delivered to such journeys after
having been laid out by the master of works. For he was gene-
rally a stonecutter. The grades of consideration attest by
the architects of the middle-age mysteries that to place ex-
cessively in direct relations with the workers. And again ex-
by one usually proposed observers was to treatise to study it.
It naturally resulted from these continual relations between
the writer and the monkey that a study of art is very sect-
ually interested on the least part of the work. Like an engra-
sion of a single thought between the mind that conceived and
the hand that executed.

Note 1.p.255. All representations of the masters of works in the middle ages show this with the free compasses of the stonecutter in hand. If we state that the master of works was necessarily a stonecutter, it is indeed that the system of so-called gothic architecture relied alcohol. It is necessary for the architect himself to trace the diagrams for the different masses of his edifice. This fact alone explains why this system of construction is rejected, as unworthy of our civilized condition, by the masters of work of our time. Although, the trade of stonecutter is a very hard one.

We have changed all that, and in our time the intermediaries
between the architect, who works in his office, and the work-
man who made the stone, are so numerous and have such dimer
ic little, that the execution is only an effaced image of
the conception.

We are certainly civilized men, but we should be more so,
if instead of artificially a reckoned barrier for the imagin-
ions that we know daily, and that give us some trouble to a
study, we should attempt to profit by them. Thus it is very
certain that in the middle ages between the master of the work
and the workman not a great distance, that our mysterious
the architect from the final execution; it would certainly not
be the architect, who could find himself bitter lamen on his
shape of the intellectual latter, but indeed the workman would
reach a higher step. To speak only of masonry, the manner in
which the diagrams are measured by the stonecutters, the i

This explains in the same edifice those differences in execution noted in a pier or vault, from one bay to another, certain variations in mouldings, etc. The materials being supplied by the owner, they were delivered to each journeyman after having been laid out by the master of works, for he was necessarily a stonecutter.[1] The system of construction adopted by the architects of the middle ages compelled them to place themselves in direct relations with the workmen. And again today one cannot proceed otherwise when he desires to apply it. It naturally resulted from these continued relations between the orderer and the executor that a stamp of art is very strongly impressed on the least part of the work, like the expression of a single thought between the mind that combined and the hand that executed.

Note 1.p.455. All representations of the masters of works in the middle ages show them with the great compasses of the stonecutter ~~in~~ hand. If we state that the master of works was necessarily a stonecutter, it is indeed that the system of s so-called Gothic architecture being adopted, it is necessary for the architect himself to trace the diagrams for the different members of his edifice. This fact alone explains why this system of construction is rejected, as unworthy of our civilized condition, by the masters of works of our times. Al Altogether, the trade of stonecutter is a very hard one.

We have changed all that, and in our time the intermediaries between the architect, who works in his office, and the workman that cuts the stone, are so numerous and know each other so little, that the execution is only an effaced imprint of the conception.

We are certainly civilized men, but we should be more so, if instead of manifesting a profound disdain for the institutions that we know badly, and that give us some trouble to s study, we should attempt to profit by them. Thus it is very certain that in the middle ages between the master of the work and the workman was not the great distance, that now separates the architect from the final executors; it would certainly not be the architect, who would find himself placed lower on the steps of the intellectual ladder, but indeed the workman would reach a higher step. To speak only of masonry, the manner in which the diagrams are understood by the stonecutters, the i

intelligence with which they are executed, indicates among t them a knowledge of descriptive geometrw, of the intersection of planes, which we have great difficulty in finding in o our time among the best stonecutters. The material execution of the cutting always attained a great superiority over that we obtain on the average. But if we seek higher tradesmen, f for example sculptors, the carvers of images, it takes many years and infinite care to train workmen able to rival those of the middle ages.

In our time the carpenters form the only body, that has retained the spirit of the workmen of the middle ages. They are organized and have retained initiative; but the carpenter does not wish this. They are united on the yard, very submissive to the knowledge of the chief, when they have properly recognized him, but perfectly disdainful for his incompetency if that is proved, which does not take long. And among building workmen the carpenters, who have known how to maintain their ancient organization are an average of the most intelligent and best instructed.

Men have occupied themselves with the workmen for several years; thinking to ensure their well-being, to find asylums for their old age; the material side of their existence is sensibly improved. But for the building, men are perhaps not sufficiently occupied with their instruction, with improving the methods. The system of competition certainly presents great advantages and also has its inconveniences; it tends to debase the workmanship, to cause the employment of incapable men in preference to skilful men, because the former accept lower conditions of wages, or indeed because they perform in less time and more badly, it is true, the required worm. That is not a means of improving the moral condition of the workman. The work yards opened at several points in France for the restoration of our old edifices of the middle ages have been nurseries of skilful workmen, because in those yards perfection in workmanship is a condition inherent in the work. All that is to be considered, but what is necessary is instruction for the building workman; the system of guilds exists no longer, and it would be necessary to replace it by a system of applied instructiou. While waiting, the architects on their work yards can exert a very salutary influence ou the work-

workmen that they employ, if they will take the trouble to o occupy themselves directly wit the work entrusted to them, a and if the do not disdain themselves to explain to them the means most suitable for obtaining perfect execution.

End of Volume VI.

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